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CONTENTS.

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

THE CROONIAN LECTURES on the Clinical Symptoms of Cerebellar Disease and Their Interpretation. By GORDON HOLMES, C.M.G., C.B.E., M.D., F.R.C.P. Lecture IV. 111

ORIGINAL ARTICLES.

Experimental Bases of the Theory of Gangræna Arteriitica Suprarenalis. By Prof V. A. OPPEL, F.R.C.S. (Specially translated by Dr. F. G. Clemow, C.M.G.) 116

Alcohol Injection in Facial Neuralgia. By WILFRED HARRIS, M.D., F.R.C.P 122

Venous Angeioma of the Cerebral Cortex. By CECIL WORSTER-DROUGHT, M.A., M.D., and Sir CHARLES A. BALLANCE, K.C.M.G., F.R.C.S.—(*Illustrated*) .. 125

The Intestinal Flora as Revealed by the Use of a New Culture Medium. By D. CHALMERS WATSON, M.D.—(*Illustrated*) 127

Unification of Local Health Administration. By E. W. HOPE, O.B.E., M.D., D.Sc. 157

MEDICAL SOCIETIES.

Medico-Legal Society: Acute Arsenical Poisoning 129

Royal Society of Tropical Medicine and Hygiene: Trypanosomes in the Human Brain.—Anopheles and Malaria Control in Trinidad.—Sewage Disposal in the Tropics.—The House Incidence of Sprue 131

REVIEWS AND NOTICES OF BOOKS.

Nerve Exhaustion. By Sir Maurice Craig, K.B.E., M.D. 134

Merchant Seamen. Their Diseases and Their Welfare Needs. By Fleet Surgeon W. E. Home, M.D. 135

A Text-Book of Bacteriology. Fifth edition. By Hans Zinsser, M.D., and F. F. Russell, M.D. 135

Les Occlusions Aiguës et Subaiguës de l'Intestin. Par A. C. Guillaume..... 135

Food Values: What They Are, and How to Calculate Them. Second edition. By Margaret McKillop, M.A., M.B.E. 135

Nutrition and Clinical Dietetics. Second edition. By Prof. Herbert S. Carter, M.A., M.D., and others 136

British Journal of Children's Diseases 136

Archivio di Scienze Biologiche..... 136

American Journal of Hygiene 136

LEADING ARTICLES.

DRUG ADDICTION AND ITS TREATMENT 137

FAMILY FOOD BUDGETS: A MAINTENANCE RATION .. 137

THE CARDIAC CHILD..... 138

ANNOTATIONS.

Arsenical Poisoning 139

The Interdental Papilla ... 140

Pulmonary Decortication in Chronic Empyema ... 140

Transfusion of Animals' Blood 140

A Year's Work of the Rockefeller Foundation . 141

Efficient Vaccination 141

A Hospital for Gentlewomen 141

Lead Poisoning in the Pottery Industry 141

"The Risk" 142

The Plight of Russian Doctors 142

SPECIAL ARTICLES

Infant Welfare Conference: How Far Should Treatment be Undertaken at an Infant Welfare Centre? 132

Royal Society of Medicine: Revival of the Annual Dinner..... 143

British Congress of Obstetrics and Gynæcology: Discussion on the Prognosis and Treatment of Eclampsia..... 144

Ireland: Dublin during the Fighting 147

Australia: Bubonic Plague in Queensland. — Hospital Finance.—Vaccination in Victoria 147

Medicine and the Law: The Case of Gaster *v.* Hirsch —Gaul *v.* Earl Spencer and Others.—An Unexplained Death 148

CORRESPONDENCE.

The Official Spirit in Medicine (Dr. A. Blackhall-Morison) 149

Renal Glycosuria or Negligible Glycosuria (Dr. George Graham) 149

Negligible Glycosuria (Dr. P. J. Cammidge)..... 149

Malignant Disease and Leukæmia (Dr. James Young) 150

The Therapeutic Administration of Gases (Dr. C. T. W. Hirsch) 150

Critical Reviews of Tropical Diseases (Captain R. C. Sheppard) 151

Complement Fixation in Gonorrhœa (Dr. T. E. Osmond) 151

"Tennis Elbow" (Dr. A. E. Chisholm) 151

PARLIAMENTARY INTELLIGENCE.

House of Lords: Smoke Abatement.—Milk and Dairies Bill 153

House of Commons: Colonial Medical Services. —Criminal Law Amendment Bill.—Condemned Houses in the United Kingdom.—Death-rate from Zymotic Diseases.—Conditions Governing Treatment Allowances.—Medical and Dental Services in the Seychelles.—Cocaine Smuggling from Germany.—Deterioration Due to Unemployment.—Education of Defective Children.—Pension Appeals and Medical Précis. 153

OBITUARY.

J. C. Ogilvie Will, M.D., C.M., F.R.S.E. 15

Arthur Nathaniel Davis, L.R.C.P., L.R.C.S., L.M. 152

THE SERVICES.

Royal Naval Medical Service.—Royal Army Medical Corps.—Royal Air Force.—Deaths in the Services.—Gilbert Blane Gold Medal..... 152

MEDICAL NEWS.

University of Oxford..... 155

University of Manchester.. 155

University of Liverpool: Faculty of Medicine 155

Roy. Coll. Phys. Lond. and Surg. Eng. 155

Roy. Coll. Surg. Eng. 156

University of London 156

Bath Ear, Nose and Throat Hospital 115

Measles Epidemic in Manchester 115

Literary Intelligence..... 121

Care of Crippled Children.. 121

Small-pox in Yorkshire .. 142

Fellowship of Medicine and Post-Graduate Medical Association 142

National Conference of Local Hospital Committees 156

Tenth International Congress of Otology 156

Third International Congress of the History of Medicine 156

NOTES, SHORT COMMENTS, &c.

Loose-leaf Books for the Doctor..... 158

The Trend of Medical Study 158

Vital Statistics for 1921 of Non-Native Officials in West Africa 158

Medical Diary 156

Appointments 156

Vacancies 156

Births, Marriages, Deaths.. 157

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LECTURE IV.*

(*Delivered on June 20th.*)

THERE remain two symptoms of destructive lesions of the cerebellum which we must consider before we put together our conclusions on the nature of the defect phenomena dealt with in the preceding three lectures, and the theory of cerebellar function to which these conclusions lead us.

BÁRÁNY'S POINTING TEST.

The importance lately attached to Bárány's pointing test in cerebellar diseases makes it necessary to record fully the results obtained in my cases. As is well known, Bárány discovered that the deviations of the limbs in certain directions which are evoked by appropriate labyrinthine stimulation may be absent when the cerebellum is affected, and that deviations in the opposite direction may occur when the limbs are unsupported. In most of my cases spontaneous deviations only were investigated, since it was neither possible nor advisable to excite the labyrinthine reflexes by rotation or irrigation of the ear in the patients with recent gunshot wounds. This was, however, carried out in a certain number of those with more chronic affections.

Direction of Deviation.

If a normal person holds his arm outstretched horizontally in front of him the limbs usually remain in the position in which they are placed, even though his eyes be closed. In unilateral disease of the cerebellum the contralateral arm also maintains its position, but that of the side of the lesion frequently swings or deviates in one direction or other. This is not merely a passive falling away, such as occurs in atonic or asthenic limbs, since the observer's hand, if placed on the limb, may feel that this is forced in the direction in which it deviates. Deviation can be often evoked or made more pronounced by shaking the patient or tapping the arm.

Lateralward deviation is the most common. It occurred in 37 of the 41 successive cases of my series on which specific observations are recorded; in 35 of these the movement was outwards, in one it was inward, in another variable in direction, while in 4 none was ever observed. As a rule, this deviation from the position of rest occurs in the homolateral limb only when the cerebellar lesion is one-sided; the other arm occasionally swings a little in the same direction, but probably only when the injury is extensive. Owing to the tendency of the affected limb to fall under its own weight spontaneous deviations in the vertical plane are less definite; of 23 successive cases in which passive falling could be excluded the arm deviated upwards in 7, in 10 downwards, in 4 the direction of deviation was variable, and in 2 no deviation occurred. Deviation is generally more obvious in movement. It may be tested at the shoulder by making the patient, while his eyes are closed, to move his finger in either the vertical or horizontal plane from a fixed point and back to it again, with his arm steadily extended at all joints. The presence or absence of deviation at other joints of the limb may be similarly determined by fixing the more proximal segments. As there is frequently a conscious effort to correct the errors it is advisable to allow the forefinger to touch some similar object. I have generally used a linear measure on which the amount of angular error can be measured.

My notes contain observations on lateral deviation of the arm in vertical movement from the shoulder joint in 58 cases; in many of these the test was repeated several times. In 45 of these patients, outward deviation of the arm (abduction) occurred either constantly or predominantly, in 2 there was inward deviation, in 6 the direction of error was variable, and in 5 no deviation was at any time noticed. Vertical movements of the index-finger, of the hand, and of the forearm were separately tested in some of these cases; but the results were the same, the error was almost constantly outwards. Occasionally, the movements of the arm are not purely vertical; it may be raised obliquely upwards and outwards, or deviation from the vertical may occur towards the end of the movement, the finger then turning abruptly outwards or inwards. Errors in horizontal movement of the arm are less striking and tend to be more variable. The notes of 41 cases record upward deviation in 10, downward in 12, while in 10 the direction of error was variable, and in 9 none was observed.

Several factors seem to influence the deviations of the arm in movement; probably the most important of these is the position of the head. If, for instance, the right arm deviates outwards owing to right-sided cerebellar lesion when the head is straight, the deviation increases when the head is flexed to the right and diminishes or disappears, or may even be replaced by an inward error, when it is approximated to the left shoulder. Similarly forward flexion of the head tends to increase downward deviation and abolish upward errors. This influence of the attitude of the head extends to the normal limb, which also tends to deviate in the direction in which the head is moved.

The pointing test was applied to the lower limbs in a smaller number of the cases. My notes refer to observations on 15 patients only; in 10 the leg moving vertically from the hip deviated inwards, in one only it deviated outwards, and in 4 no constant errors were observed. It consequently seems that although outward deviation is the usual error in vertical movement of the arm, inward deviation is more common in the leg. In the few cases in which the effect of labyrinthine stimulation by rotation or by the caloric method was tested it was found that stimuli which normally displace the arm in the direction in which it deviates increase the error, while those which move the limb in the opposite direction diminish or annul it.

Theories of Spontaneous Deviation.

The nature of this spontaneous deviation and the causes to which it is immediately due are still obscure. According to Bárány the cerebellar cortex contains four "centres of direction" determining movement at each of the joints of the limb in the corresponding planes of space; normally the two centres for vertical and those for horizontal movement balance one another, and when one is destroyed its antagonist prevails. André-Thomas and Durupt have put forward a somewhat similar hypothesis, that local lesions of the cortex produce an anisosthenia or unequal distribution of tone in opposing groups of muscles, and that the limb deviates in the direction of action of the group possessing more tone. Each of these hypotheses would explain the deviation, but there are objections to each. I have never been able to detect the anisosthenia described by Thomas. If it occurred so frequently as to cause deviation in the majority of cerebellar lesions a more constant error in direction

* Lectures I., II., and III. appeared in THE LANCET of June 17th and 24th and July 8th respectively.

than occurs might be expected in ordinary movements; even Thomas has stated that this can be observed only occasionally. And it is scarcely credible that such gross lesions as existed in many of my cases could have produced alterations of tone limited to one set of muscles, leaving their antagonists undisturbed or relatively hypertonic.

The fact that gunshot wounds, tumours, and other affections of one lateral lobe of the cerebellum produce outward deviation of the arm in the great majority of cases, regardless of their situation, is difficult to explain by either theory. The greater frequency of outward deviation has been observed by others, and various explanations of it have been put forward. Auerbach's hypothesis that the adductor mechanisms are more frequently damaged owing to their wider representation in the cortex, and that the intact abductor centres then displace the arm outwards, can scarcely account for it. Nor is Rothmann's assumption that the abductor centres are more developed satisfactory, especially in view of the accurate localisation of these centres claimed by Bárány.

The frequency of similar deviations in lesions of the forebrain, even in conditions which from their nature cannot disturb the functions of the cerebellum, complicate the problem, and make it difficult to offer any explanation of general application. It is not yet possible to decide definitely whether it is through the cerebellum that labyrinthine impressions act in exciting deviations as Bárány assumes; or whether deviation is an independent function of the cerebellum which can neutralise the effects of the labyrinthine excitations, but the fact that Magnus and de Kleijn have been able to elicit their tonic labyrinthine reflexes in absence of the cerebellum is in favour of the latter view.

SENSATION.

The question whether any form of sensation is disturbed by destructive lesions of the cerebellum has been revived by recently published observations. Magendie first suggested that the cerebellum is an organ of "muscle-sense." Lussana elaborated this view, assuming that the position of the centre of gravity of the body and of its different parts is perceived through the cerebellum by means of the afferent fibres which it receives from the dorsal columns of the cord. Though physiological investigations as well as numerous clinical observations failed to lend any support to this view of the cerebellum as a sensory organ, it has been again put forward by Lewandowsky, who regarded the disorders of movement resulting from cerebellar disease as a "sensory ataxia," which is always accompanied by disturbance of "muscle-sense." Rothmann has also described an affection of "deep sensibility," or of the sense of position, after cortical lesions in animals. Munk, Hitzig, Mann, and more recently, Jelgersma have, on the other hand, regarded the cerebellum as an organ of "unconscious sensation" (unbewusste Sensibitität), the afferent impressions that reach it remaining below the threshold of consciousness, or reproducing representations of a low order that can be consciously perceived only when transmitted to the forebrain. Others, as Risien Russell, have described an affection of cutaneous sensibility by acute cerebellar disease, since animals subjected to experimental lesions may not react normally to superficial stimuli.

But as no sensory disturbances have been found regularly associated with even the severest affections of the cerebellum in man, these views have attracted little attention from clinicians. Within the last few years, however, more definite changes have been described. First Lotmar, and later Maas, Goldstein, Reichmann, and others have discovered a disturbance in the appreciation of weight by the affected arm. Goldstein, Reichmann, and André-Thomas have also described defects in the sense of position, while the two former also record diminished sensibility to pressure and vibration, and even disturbances of spatial and temporal perception. I have repeatedly examined all forms of sensation in patients in whom, as far as could be determined from their symptoms, the lesions were limited to the cerebellum, but in no single instance did I discover any alterations of cutaneous sensibility or of the sense of position. It is true that, as Luciani has pointed out, the withdrawal of the affected limb from a painful stimulus may be less prompt than on the normal side, especially when the lesion is acute, but there was never any alteration in the threshold of, or subjective difference in, the sensations evoked by tactile or painful stimuli. Nor have I been able to detect any diminution or alteration of the sense of position by any of the ordinary clinical tests. My patients with their eyes closed have always been able to bring the normal hand immediately and correctly to the affected one, after this had been moved passively in space; they could reproduce accurately with the normal limb attitudes given passively to the affected; and they never presented any sign of diminished appreciation of shape or size. I have investigated the threshold of pressure sensibility in a few cases only, and in these no difference existed between the normal and affected sides.

The Appreciation of Weight.

There is, however, no doubt that a patient with a unilateral lesion may be unable to compare accurately equal weights, or weights in which the difference is small, placed in his two hands. In 18 of my cases this test was used, and in many of them on several occasions over long periods. In 4 cases equal weights were always adjudged equal, in 3 the results were so irregular that no conclusion can be drawn from them, and in 11 the weight placed on the affected hand was constantly estimated by the patient as the heavier, when they were actually equal or the difference was small. Consequently, the majority of my patients over-estimated the weight on the abnormal side. Some of the more intelligent recognised this subjectively, particularly when heavy weights were employed; one man three months after receiving a gunshot wound in the right lateral lobe of the cerebellum, stated, "every weight I try to lift seems heavier to my right hand." The only patient who, when identical weights were employed, ever judged the weight on the affected hand as lighter, was variable in his replies during the first four weeks after the wound, and during the next two months generally described the weight on this hand as heavier.

Such observations do not, however, necessarily indicate a disturbance in the appreciation of weight since the tendency to over-estimate on the abnormal limb might be due to an affection of mobility rather than to a sensory defect. Every paretic limb exaggerates the load it carries if its sensation be normal, and the asthenic cerebellar arm may similarly over-estimate the resistance that the test object opposes to its movement. The difficulty in raising and lowering the hand regularly, as is normally done in attempting to estimate a weight, may also contribute.

We can speak of a disturbance in the appreciation of weight only when there exists an inability to discriminate between two weights above the normal difference threshold which are placed successively on the limb. In each of my cases where the comparison of identical weights placed on the two hands revealed any alteration, the threshold was carefully ascertained in the normal limb, and then a series of observations were made with the same two weights on the affected side. No difference in the accuracy of discrimination of the two limbs could be detected in any of these cases, and we are consequently forced to the conclusion that the appreciation of weight is not affected directly by cerebellar disease. The tendency to over-estimate weight on the affected side may be partly explained by the asthenia of the limb. Another possible factor is the toneless state of its muscles, owing to which the proprioceptive nerve-endings within them may be less easily excited when they contract or are subjected to strain by the resistance

of raising the weighted limb. It is a priori possible that, as Goldstein suggests, this factor would also influence the recognition of the position of the limb in space, but I have been unable to detect such disturbance. Goldstein and Reichmann have attempted to differentiate symptom-complexes due respectively to irritative and destructive lesions of the cerebellum, the chief feature being over-estimation of weight in irritative states, and under-estimation in destructive. It seems extremely improbable that any such distinction can be made. Certain of my patients who invariably judged the weight in the affected hand the heavier had long-standing quiescent lesions in which persistent irritation was very improbable, while others suffered with recent gunshot wounds. In fact, this and the other symptoms of cerebellar disease present no qualitative differences in the acute and the chronic stages of the lesion which can permit us to distinguish irritative from destructive effects. The cases in which Goldstein and Reichmann observed sensory disturbances were particularly unsuitable for the investigation of sensation; in three the condition was diagnosed as meningitis serosa, which is rarely a local or circumscribed affection; in a fourth there was a history of a gunshot wound, but as no scar was visible a diffuse concussion injury that possibly involved the brain-stem was more probable; in one of Reichmann's cases sensory disturbances which were regarded as hysterical complicated the picture, and in the other there was a labyrinthine concussion. Other portions of the nervous system were probably involved in all these cases, and it is consequently impossible to conclude that the defective discrimination of weights and the other disturbances of sensation observed by these authors were due to cerebellar lesions.

FUNCTIONS OF THE CEREBELLUM.

As we have described the chief symptoms of destructive lesions of the cerebellum, and discussed as far as was possible their nature and significance, we can now consider what light our observations and analysis throw on the normal functions of this organ. Attempts to determine physiology by arguing from pathological manifestations are, however, fraught with danger, for the functions of any organ cannot be defined in terms of defect phenomena; and clinical symptoms are not always merely defects of normal function, since compensation by unaffected parts of the organ or other parts of the nervous system may influence them. But when we keep before our minds these possible fallacies, observations of the symptoms of its disease in man can offer contributions of value to the physiology of the cerebellum.

The interpretations offered of the chief disturbances of function in our cases show that they can be explained by a small number of elementary disorders. The flaccidity and lack of elasticity of the muscles are obviously due to diminution or loss of that state of normal tension in them which clinicians speak of as tone. The inability of the limbs to maintain attitudes in opposition to gravity or to the action of external forces, and the tremor or unsteadiness which develops under these influences, are a result of loss of that tonic component which stabilises and sustains the voluntary contractions of the muscles. The excessive associated movements of the affected limbs during vigorous muscular effort of other parts of the body also result from deficiency of the muscular tone that determines and maintains their normal postures; and in nystagmus and in the knee-jerk we have even more direct manifestations of the effect of loss of postural tone. The relative asthenia and fatigibility of the limbs, and the clonic or intermittent character of the contractions of their muscles in even the simplest movements, are a natural consequence of the lack of fusion of the twitch contractions of the muscles and of the replacing of inexhaustible postural tone by voluntary effort which tires more quickly.

On investigating the disorders of movement we discovered that hypotonia plays a large part in these too; errors in range can be attributed partly to deficiency of that tone in the antagonists which should steady or moderate the action of the prime movers, and partly to lack of tonicity in the muscular contractions which should not merely arrest, but also fix, the limb in the position in which it is arrested. Errors in direction are mainly due to the failure of adequate fixation of the moving segments or of the parts on which they move; the irregularity in rate of movement and tremor result partly from the intermittent and irregular manner in which the prime movers contract owing to lack of an adjuvant tone, and partly from absence of the steadying influence of normally-toned antagonists. The influence of disturbances of tone is still more prominent in complex actions; the disorders of gait are largely due to inadequate postural fixation and incorrect postural relations of the different segments of the limbs to one another, and of the trunk to the limbs; while we have seen that the irregularities in the movements of the individual limbs are mainly a result of hypotonia. The abnormalities of speech, too, can be explained by disturbances of the relations in posture and in movement of the separate organs concerned in it. In the inability to perform alternate movements rapidly, and in the irregular adventitious movements of the limbs which accompany attempts to do so, lack of fixation tone in the muscles also plays a very large part. Finally, the only sensory disturbance that exists in cerebellar disease—that is, inaccuracy in the comparison of weights—depends on deficient tone in the muscles, and not on a primary defect in any sensory quality.

But in these descriptions we are employing the word *tone* in two different senses, or we are dealing with at least two different manifestations of tone. In the first place we apply it to the tension or elasticity of normal muscles which opposes or restricts their sudden elongation; in the second place we signify by it that property of muscles owing to which they exert a certain and indefatigible tension regardless of their length, and consequently fix those segments of the body on which they act in attitudes into which they are brought either actively or passively. This same tone, according to Sherrington, fuses with, reinforces, and stabilises muscular contractions otherwise excited. It is a reflex state excited mainly from the proprioceptive organs of the muscles themselves, and is subject to the same laws of excitation and inhibition as reflex muscular contractions. But while these can be excited, maintained, and coördinated by the lowest levels of the nervous system alone, postural tone seems to require the coöperation of higher nervous levels, and, as we shall see, the cerebellum is actively concerned in it.

Disturbances of Coördination.

It has not been possible, however, to explain all the symptoms of cerebellar disease by disturbances of tone alone. Delay and slowness in starting and effecting muscular contractions and relaxations are prominent features in many cases, and they cannot be attributed wholly to atonia. They also are certainly an important factor in some of the motor disorders. A slowness in effecting relaxation of contracting muscles may make the movement attempted excessive or hypermetric: and a greater delay in the contraction of one set of muscles than of others with which it should act synchronously may lead to decomposition of movement and errors in direction. The slowness and irregularity in performing rapid alternate movements are also due chiefly to the time lost at the turn of the movement, owing to failure of the one group of muscles to relax immediately and of the other to contract at once. We have also seen that the explanation of the disorders of gait and the inaccurate coöperation of agonists and synergic muscles in other actions requires the assumption of a disturbance in the measure and time relations of the contractions of muscles that should work together harmoniously. We are consequently compelled to admit that the disorders of movement in cerebellar disease

are in part due to lack of harmony and accurate coöperation of the various muscular contractions and relaxations that are required in an act, and there is consequently an incoördination or ataxia of movement in its literal sense. But a fuller recognition of the part that postural tone plays in both active and passive attitudes and in movement has cut down enormously the symptoms in the explanation of which it is necessary to invoke incoördination. At the same time a more careful analysis of the motor disorders makes it possible to account for the ataxia by simpler factors, particularly by a lack of synchronicity in the actions of muscles that should contract at the same time, or a disturbance in the time relations of those that should contract in succession.

The nature of the influences exerted by the cerebellum on the motor system can probably not be settled by clinical investigations alone. There are two possibilities.

The first is that the cerebellum is concerned only in the maintenance of a proper state of tone in the musculature as a whole, that it has a general and unvarying influence only, and does not participate in the separate stages of a movement or action. The disorders of movement in cerebellar disease would be, therefore, if this assumption were correct, due to defects in the lower mechanisms through which the higher levels of the nervous system excite movement. There are, however, many facts which make it difficult to explain all cerebellar disorders by this view. In the first place, ablation of the cerebellum does not abolish the tonic reflexes of labyrinthine and muscular origin which have been studied by Magnus and his collaborators, and the postural reactions that may be excited in the decerebrate animal also persist after its removal. The explanation may be that the labyrinths acting alone are able to maintain a tone sufficient for the reflexes elicited from them, and that the medullary mechanisms through which the decerebrate reactions are evoked are also tone exciting for their own purpose. That this is so is shown by the fact that Sherrington, Horsley, and Lowenthal have proved that stimulation of the cerebellum may inhibit decerebrate rigidity.

The other possibility is that the accurate combination and correlation of the phasic and tonic elements of every movement demand the active intervention of the cerebellum, and that the tonic supplement to tetanic contractions as well as the modifications of tone in the antagonistic, synergic, and fixating muscles are excited or controlled through it in every stage of every movement. We have found it necessary to invoke this hypothesis in explanation of many of the symptoms, and there are consequently two factors contributing to the disorders of movement in cerebellar disease; in the first place a deficiency of postural tone in the moving parts, in the second place a lack of harmony and coördination in its modifications in the muscles engaged in the movement. And since postural tone and its regulation is a reflex function we speak of a disturbance of "reflex adjustments," to adopt the term Ferrier employed nearly 50 years ago, as one of the factors in cerebellar ataxy.

Though there can be no doubt that the distribution and regulation of tone is dependent largely on the lower reflex levels of the nervous system, this does not exclude the possibility that the cerebellum takes a part in determining its grading or measure in the separate groups of synergic muscles concerned in every act. Our investigations, therefore, point to the conclusion that the cerebellum plays two distinct though closely allied rôles in movement: 1. It is a part, and probably the controlling part, of those central mechanisms which maintain and regulate the distribution of postural tone in the muscles. In this rôle the cerebellum has a continuous and unvarying function. 2. During movement it regulates and coördinates the modifications of tone that accompany the relaxations and contractions of all groups of muscles directly or indirectly concerned in the movement. In this function its activity is discontinuous and variable.

FUNCTIONAL LOCALISATION.

The question whether a localisation of function exists in the cortex of the cerebellum is not yet settled; even among those who maintain the existence of localisation there is no general agreement on what is localised, or on the topographical representation of either special functions or separate segments of the body. The earliest investigations devoted to this subject were the electrical stimulation of Sir David Ferrier, who, by faradisation of various points of the surface, elicited lateral and vertical movements of the eyes and head, as well as less definite movements of the homolateral limbs, from which he concluded that the cerebellum is a complex arrangement of individually differentiated centres. These results were to some extent confirmed by Nothnagel and others. From later observations, however, Horsley and Clarke concluded that the cortex of the cerebellum is inexcitable, and that the motor reactions obtained by earlier observers were probably due to spread of the current to the brain-stem or to the trunks of the cranial nerves. But more recent investigations have thrown some doubt on Horsley and Clarke's conclusions, as they have shown that under certain conditions motor reactions can be obtained from the cerebellar cortex by the use of moderate or even weak currents. The modern search after a functional localisation can be traced to Bolk's comparative anatomical study of the cerebellum. By examining this organ in a large series of mammals he discovered a principle of subdivision by means of which all its various parts can be compared, and their homology ascertained in different species. On making such a comparison he found a parallelism between the relative size of certain parts of the cerebellum and the development of groups of muscles which are associated together for special functions. Then arguing that form is determined by function, and that morphology can at least indicate the relative development of a function, he concluded that the cerebellum is a complex of organs, each with a distinct physiological duty. The logical outcome of these observations was an attempt to determine a localisation, or rather to map out the physiological representations of different portions of the body in the cortex of the cerebellum. Bolk's conclusions were: That the lobus anterior, the unpaired segment in front of the primary sulcus, contains centres for the eyes, tongue, jaw, face, larynx, and pharynx; that in the lobulus simplex immediately behind it the neck muscles are represented; that the lobuli ansiformes and paramediani, which represent the larger portions of the lateral lobes, contain paired centres for the movements of the individual limbs; while in the middle part of the vermis, or lobus medianus posterior, there is an unpaired centre for the bilateral synergic movements of the limbs, and in the inferior vermis a centre for the trunk musculature.

Bolk's investigations at once attracted attention, and several physiologists naturally sought to test his conclusions by experimental methods. The most important of the earlier researches were those undertaken by van Rijnberk, who removed small portions of the cortex in several of the functional areas described by Bolk. His results appeared to confirm the conclusions which Bolk had already drawn, but the anatomical examination by Binnerts of the brains on which he had operated showed that in many of them the lesions extended deeply into the white matter of the cerebellum and in some cases injured the central nuclei. Vincenzoni, Marassini, Luna, Pol, and others repeated these experiments, but though they all claim to have found evidence of localisation their conclusions diverge considerably.

The experimental investigations of Rothmann, and especially those of Thomas and Durupt, in which the extent of the lesions were controlled more accurately by anatomical examinations, also tend on the whole to confirm Bolk's theories, though their localisations differ from his in many details. Thomas concludes that the vermis contains centres for the synergic movements of the head, trunk, and limbs,

while each lateral lobe is concerned in the regulation of movement of isolated parts of the body and possesses separate areas for the homolateral limbs. These areas are made up of secondary centres for each articulation, and in these articular centres there is a separate representation of muscles according to the plane of space in which they move the limb. This attempt at an extremely intimate localisation is surprising when we remember that there is far from being any general agreement as to the representation of even larger segments of the body in the cerebellar cortex. The discrepancies in the conclusions of even the most recent observers may be illustrated by the fact that while according to Ingvar the lobus posterior (inferior vermis) contains centres for those muscles that prevent the animal falling backwards, Simonelli, repeating his experiments, could find absolutely no confirmation of this. Another excellent instance of the present state of the theory of localisation is, that while Bolk assumed that the formatio vermicularis contains centres for movement of the tail, according to Rothmann its destruction produces disturbances of movement at the head, Thomas and Durupt found that lesions of it were followed by symptoms in the lower limb, and Bárány that it influences the movements of the eyes only. Rossi, from his recent studies, has concluded that there are not absolute or circumscribed cortical centres, but probably at the most only a "*prevalence of representation*" of segments of the body in certain extensive areas of the cortex.

Another interesting scheme of cortical localisation has been put forward by Bárány, who assumes that each limb is represented in two or more distinct cortical centres, in each of which there is a further representation of the muscles according to the segment of the limb on which they act and the direction in which they move it. The centre for the outward deviation of the arm, for instance, lies in the lobuli semilunares superior and inferior, that for inward deviation in the lobulus biventer, and in this the hand is represented most medially, the arm more laterally. Bárány's theory is based upon the spontaneous deviations which occur in the pointing test in local lesions of the cerebellum, and on the absence of reactional deviations on labyrinthine stimulation. It must be noted that the representation of different segments of the body according to his scheme differs considerably from that assumed by Bolk and obtained by several physiologists; for instance, Bárány places some of the arm centres caudal to the centres for the lower limbs. It is these great discrepancies in both the topography of functional representation and in the views of what is localised that make it so difficult to accept any of the conclusions that have been put forward.

Facts Unfavourable to Localisation.

Investigations by other methods do not strengthen the case of localisation. Rossi, for example, finds that electrical stimulation of one side of the cerebellum lowers the threshold of excitability of the opposite cerebral motor cortex; and if one point of the latter is selected, as that which evokes flexion of the arm, its excitability can be modified equally from several regions of the cerebellum; these experiments therefore do not indicate a more intimate connexion of one point than of any other in the cortex of the cerebellum with a focal motor point of the opposite cerebral hemisphere. Conversely, Beck and Bikeles have found that the electrical variations in the cerebellum produced by stimulation of the motor cerebral cortex show no local tendency. Finally, according to Miller and Banting, faradisation of a point in the anterior portion of the vermis may inhibit decerebrate rigidity in both the homolateral limbs and excite complex bilateral movements.

The lesions in my own cases of gunshot wounds involved diverse portions of the cerebellum. Some were large and deep, in others there was probably at the most only a very limited destruction of the cortex. In the majority the posterior and inferior surface was injured, but in several the damage was limited to the superior surface. The tumours observed by me also occupied many different regions of the cerebellum. Consequently my material, extending to nearly 100 cases of local cerebellar lesions, affords an excellent opportunity of testing the reliability of the various theories of localisation that have been put forward. There can be no doubt that the movements of the head, neck, and trunk, and in fact of all movements that require the coöperation of bilateral muscles, are more severely disordered when the vermis is injured than when the lateral lobes only are damaged, and we must consequently accept a representation of those parts of the body that act bilaterally in the vermis. Certain facts indicate that there may be a further localisation of function within the human vermis; I have, for example, observed a tendency to fall or stagger backwards in tumours and other lesions of its posterior portion, and a falling forwards in one case at least of tumour in its anterior part.

My observations do not lend support to the theory of circumscribed functional representation of different parts of the body in the lateral lobes. I have invariably found that the symptoms produced by a small lesion were never limited to one limb or a segment of a limb; that if any abnormality could be detected in the arm the leg was affected too, and that there was very frequently in addition some disturbances in the functions of the cranial nerves. In a certain number of cases, however, the one limb seemed to be relatively more affected than the other, the leg being more involved by caudal and mesial lesions, and the arm by the more anterior. It is possible, then, that there is a "prevalence of representation" in Rossi's sense, the arm being represented more anteriorly and the leg more posteriorly, but this localisation is so indefinite that I would not regard it as a trustworthy guide in the diagnosis of a small lesion, such as a cortical tumour.

There are two clinical facts brought out by my observations that tend to invalidate many of the schemes of cortical localisation that have been put forward. In the first place, Bolk and many of his followers have claimed that the ocular movements are represented in the lobus anterior or superior vermis, but, as will be remembered, I have observed nystagmus or other disturbances of the ocular movements in practically all local lesions, no matter what their situation was. In the second place, Bolk placed the representation of the organs of phonation and articulation in the lobus anterior, and Rothmann and Katzenstein and others have described a cortical centre for the larynx here too, but in my experience speech may be affected by lesions of any portion of either the vermis or lateral lobes, though it is more liable to be severely disturbed when the vermis is injured.

My observations consequently lend no support to a circumscribed or focal representation of different portions of the body in the cortex of the cerebellum, apart from the fact that the vermis is concerned mainly with movements requiring the coöperation of muscles on the two sides of the body, and the lateral lobes mainly with the functions of the homolateral limbs.

BATH EAR, NOSE AND THROAT HOSPITAL.—At this hospital there is accommodation for 50 in-patients. The board has always regarded it as a matter of the utmost importance that all patients for tonsil and adenoid operations should be treated as in-patients, and for the past two years has carried out these operations on the lines suggested by a recent resolution passed by the Section of Laryngology of the Royal Society of Medicine.

MEASLES EPIDEMIC IN MANCHESTER.—The epidemic of measles in Manchester shows some slight abatement; for the week ending Saturday, July 8th, the number of new cases was 905, as compared with 1115 for the previous week. That week's record came near that of the week ending June 17th, when the number of cases was 1167 with 24 deaths. This is one of the worst epidemics of measles that has occurred in Manchester. Altogether, during the week ending July 1st, 1368 new cases of dangerous infectious disease were registered, as compared with 342 for the corresponding period last year.

ON THE EXPERIMENTAL BASES OF THE THEORY OF GANGRÆNA ARTERIITICA SUPRARENALIS.

BY PROF. V. A. OPPEL, HON. F.R.C.S. ENG., PETROGRAD.

(*Specially Translated by* Dr. F. G. CLEMOW, C.M.G.)

IN the autumn of 1921 I made a communication to the Pirogof Surgical Society on the subject of Gangræna Arteriitica Suprarenalis.[1] I was able to suggest, by a series of data, that so-called idiopathic gangrene is the result of excessive activity of the suprarenal glands—a result, that is, of hypersupradrenalism or hyperadrenalism. One of the foundations of this theory, which explains firstly the affection of the arteries and secondly the occurrence of gangrene, is found in the fact—first put forward by Prof. S. S. Girgolaf[2]—that the blood-serum from cases of so-called spontaneous gangrene contains a larger quantity of vaso-constrictor substances than does the serum of healthy subjects. This was subsequently confirmed by Drs. Trusof, Gliebovitch, and Akhutin.

Views of the Kravkof School.

This observation gave rise to a criticism of my theory by the school of Prof. N. P. Kravkof, in a detailed paper read by Dr. P. N. Stradyn at the "inter-chair" meetings of the Army Medical Academy. Prof. Kravkof's school put forward the following propositions: (1) In the coagulation of blood certain protein-forming amines are formed, possessing vaso-constrictor powers, and therefore the vaso-constrictor effect of the serum may be ascribed, not to adrenalin, but to these protein-forming amines; (2) in the blood plasma from such cases it has never been possible to prove that the vaso-constrictor substance is adrenalin; (3) adrenalin is a substance that breaks up so rapidly that it is not found in the peripheral vessels.

Any thesis put forward by Prof Kravkof's school is usually based upon very carefully conducted experiments. There thus arises a real scientific controversy over my theory—a controversy of serious import, since, acting on that theory, I have proposed, for the treatment of so-called spontaneous gangrene, excision of the left suprarenal body—in other words, I have proposed to treat a severe disease by a severe operation, with a view of removing the hyperadrenalæmia.

Is the Vaso-Constriction Produced by Protein-Forming Amines or by Adrenalin?

I quite realise that, if my theory is correct, it can only be converted into scientific fact by a variety of proofs—chemical, pathologico-anatomical, experimental, and clinical. As serious criticism of my theory has hitherto been based on experiment, it is essential that I should dwell in the first instance on the experimental side of the question. Ten or 15 years ago it was accepted that the vaso-constrictor substances in the blood were identical with adrenalin. One spoke of the quantity of adrenalin in the blood on the basis of the vaso-constrictor substances in its serum. But in the monograph of A. Biedl[3] may be found proofs that this conclusion is incorrect, that the vaso-constrictor substances in the blood serum are not identical with adrenalin and that substances formed in the coagulation of blood themselves possess vaso-constrictor powers. At present this admits of no doubt. Prof. Kravkof, therefore, is quite right in saying that the quantity of adrenalin in a blood cannot be measured by the vaso-constrictor powers of its serum.

It follows that, in this controversy, it must be taken as a premiss beyond dispute that in the coagulation of blood protein-producing amines are formed, possessing vaso-constrictor powers. Taking this as a fact, based on present-day knowledge, I must none the less insist that the blood serum of so-called spontaneous gangrene cases *always* possesses greater vaso-constrictor powers than normal blood serum. Dr. Stradyn, who opposes my theory, also admits that such blood serum gives the impression of being richer in vaso-constrictor substances. In a word, the fact first demonstrated by Prof. Girgolaf must still be recognised as a fact. This being so, there immediately arises the question—Why is the blood serum of so-called spontaneous gangrene cases richer in vaso-constrictor substances? This may be ascribed to one of two causes: (1) Either the blood of such patients is so altered that on coagulation it produces a larger quantity of protein-forming amines than normal blood; or (2) an excessive quantity of adrenalin is added to the blood, increasing its vaso-constrictor powers. One may accept any explanation one likes of the existing fact, but in order to shake my theory it is, of course, necessary to prove that the increased vaso-constrictor effect of the serum of such cases is to be ascribed to the protein-forming amines and not to adrenalin. Personally I submit that it may be ascribed to adrenalin. I shall bring forward proof of this later, but meanwhile, in order not to get lost in controversy, I must be permitted to make this reserve. At present it is accepted that the secretion of the suprarenal glands is identical with adrenalin. Possibly the adrenalin entering the general circulation from those glands assumes, not a crystalline but some sort of colloidal form. I am unable myself to answer this question, but by "adrenalin" I understand, at this moment, the secretion of the suprarenals, entering the general circulation and possessing vaso-constrictor powers.

Adrenalin in "Spontaneous" Gangrene Blood Plasma.

A more practical consideration raised by Dr. Stradyn is his assertion that the presence of adrenalin cannot be demonstrated in the blood-plasma of so-called spontaneous gangrene cases. From the experimental data collected in Biedl's monograph, it must be admitted that, in healthy animals, adrenalin can only be shown to be present in the blood plasma of the suprarenal veins; in the peripheral vessels its presence cannot be detected. If this be so, and if Dr. Stradyn cannot find adrenalin in the blood plasma of so-called spontaneous gangrene cases, perhaps we should cease to speak of adrenalinæmia or adrenalæmia, and so my theory would have to be regarded as upset.

With such a conclusion, however, I cannot agree. In the first place, I submit that the experiments of Dr. Stradyn should be most carefully verified. If experiments conducted under the same conditions as those of Dr. Stradyn give a similar negative result, it will be necessary to determine: (1) The degree of dilution of the plasma used in the laboratory investigations, and (2) the degree of sensitiveness of the analysing apparatus.

If, as O'Connor affirms, the blood serum from the suprarenal veins contains 1 in 1,000,000 to 1 in 5,000,000 of adrenalin, then the dilution of this blood, say, by 1 in 100, will give a solution of adrenalin of 1 in 100,000,000 to 1 in 500,000,000—that is to say, such a dilution of adrenalin as may possibly give no reaction on the separated ear of a rabbit. Now Dr. Stradyn diluted the plasma from so-called spontaneous gangrene cases 500 times. Moreover, there is an undoubted relationship between the amount of adrenalin in a blood and the amount of vaso-constrictor substances in the serum of that blood. In proof of this relationship, I would refer to the experiments of Trendelenburg on blood serum. The average quantity of vaso-constrictor substances in the serum from the suprarenal veins (and these substances he regards as identical with adrenalin) was equivalent to 1 in 750,000 of adrenalin; the serum from peripheral vessels, on the other hand, acted as a solution of 1 in 2,000,000 or 1 in 2,500,000 of adrenalin. It follows that the vaso-constrictor effect of serum from the suprarenal veins, where adrenalin is shown to be present in the plasma, is three times as strong as that of serum from peripheral blood, in the plasma of which

[1] Chirurgitcheski Viestnik, 1922, No. 1.
[2] "Spontaneous Gangrene of the Extremities," publications of the Propædeutic Surgical Clinic of Prof. Oppel, book v., 1913.
[3] "Internal Secretions," Russian edition, 1914.

adrenalin cannot be shown to be present. Hence I claim the right to believe that the increased vaso-constrictor effect of the serum of so-called spontaneous gangrene cases may be ascribed to hyperadrenalinæmia of a pathological character.

Problematical Value of Experiments on Separated Organs.

I spoke above of the importance of the sensitiveness of the apparatus employed in the quantitative analysis of adrenalin in the fluids examined, including blood and serum. As is well known, the school of Prof. Kravkof generally employs the separated ear of a rabbit for such analyses. Quite recently Dr. S. V. Anitchkof used the separated human finger for the purpose, such fingers being taken either from a limb after amputation or from the dead body. In order to bring the controversy to a more definite point, most careful attention must be given to the methods of investigation which are at the very basis of the controversy. I wish to do the fullest justice to the remarkable investigations of Prof. Kravkof's school and to the valuable conclusions to which they lead; but on one point I have doubts, and I ask: Can a separated ear or finger be regarded as an apparatus which will decide, beyond dispute, the question of the presence or absence of a certain quantity of adrenalin in the fluid under investigation, understanding by the word "certain" such a quantity as to have a real significance in human pathology and physiology? In this connexion certain doubts must arise. In his admirable work "On the Activity of the Vessels in Separated Human Fingers in Health and Disease" (Dissertations, Petrograd, 1922) Dr. Anitchkof writes:—

"At the beginning of the experiment, as a rule, spasm of the vessels is observed. In spite of the cannula being placed in an exactly right position and of a sufficiently high pressure in the burette, only a very slight flow of fluid comes from the finger placed in the apparatus—merely a few drops per minute. As time goes on, the flow increases and at length reaches a constant quantity. This initial spasm of the vessels is also seen in a separated ear to an even greater degree .... The 'initial spasm' not rarely lasts for one or even two hours."

This means that, as a rule, the experiment starts with a spasm of the vessels—in any case a pathological phenomenon. It becomes then necessary to know the cause of this spasm. Unfortunately, in the writings of Prof. Kravkof's school no explanation of the spasm is given. I venture therefore to give my own views on the subject as far as I can.

Some considerable time ago I carried out certain experiments on the internal organs of animals.[4] If the abdomen of an animal under general anæsthesia be opened and the aorta be compressed immediately below the diaphragm the whole bowel becomes pale or white, owing to the stoppage of the arterial blood-supply. At the same time there is marked contraction of the bowel walls. From this I conclude that the anæmia causes the contraction of the non-striped muscle of the bowel. It is only natural to assume, therefore, that the anæmia in the comparatively strong muscles of the arteries themselves is also accompanied by spasm. In this manner, if a man dies, or if a limb is amputated, the arteries become bloodless and their non-striped musculature passes into a state of spasm.

There is nothing in this contrary to our present knowledge. We know, for instance, that in dead bodies the arterial system is generally empty, for when the heart's action ceases and the vessel walls become anæmic the arteries contract, expel the contained blood into the venous system, and fall into a state of spasm from bloodlessness. I shall speak again immediately of the spasm of arteries resulting from bloodlessness, because I differentiate this spasm from that other form of arterial spasm caused by the bloodlessness of organs. Such spasm can be, and is, observed under the influence of toxic substances, including adrenalin itself.

Thus, in the separated ear of a rabbit or in a human finger an initial spasm of the arteries is always observed, and this, in my opinion, is caused by the bloodlessness of their walls. If this be so, an interesting consequence follows. We surgeons often have to have recourse to a so-called bloodless tourniquet. If such tourniquet be applied to a limb not already deprived of blood by means of an elastic bandage, then in the subsequent operation we may find blood in the veins but none in the arteries, which are absolutely empty. The explanation of such phenomena is found in the fact that the arteries contract when the blood-flow ceases and fall into a state of spasm; but no sooner is the tourniquet removed than the arteries immediately, or almost immediately, dilate, particularly the smaller arteries, and a condition of "arterial hyperæmia" results. This may be explained in various ways, but the fact remains a fact—arteries contracted and in a state of spasm rapidly dilate when the flow of oxygenated blood through them is re-established.

If a quantity of Ringer-Locke solution with oxygen be passed into the arteries of a separated ear or finger the arteries do not respond by dilating, but remain for a more or less prolonged period in a state of spasm. The difference is most striking. Involuntarily one is led to think that not only are the vessels of a separated ear or finger in a state of spasm, but that something else is added to this—a cadaveric rigidity of the muscles of the arterial walls. I consider myself justified in making this suggestion, because in the work of Anitchkof may be found proof that the duration of the arterial spasm depends on the time elapsed between the moment of the death of the organism or the separation of the finger and the beginning of the experiment. The longest duration of the spasm corresponds with the longest duration of this interval.

Experiment 29: Finger placed in apparatus 6 hours after death; "prolonged spasm." *Experiment 30:* 6½ hours after death; also "prolonged spasm." *Experiment 31:* 8 hours after death; spasm lasted 4 hours. *Experiment 33:* 8½ hours; spasm for 2 hours. *Experiment 34:* 7 hours after death; spasm for 4 hours. *Experiment 5:* 5½ hours after amputation, spasm for 2 hours. As a contrast to this, in *Experiment 1*, when a finger was placed in the apparatus 30 minutes after amputation, spasm lasted 1 hour. In *Experiment 4*, finger placed in apparatus 4 hours after amputation, spasm lasted 1½ hours.

From these extracts it will be seen that there is a certain relationship between the duration of the "spasm" and the interval between the moment of death or amputation and the beginning of the experiment on a separated finger. In contrast with the effect of a bloodless tourniquet, it is interesting to note that, in a finger disconnected for 30 minutes from the rest of an organism, spasm occurs and lasts for one hour, whereas a bloodless tourniquet lying on a limb for over an hour causes no such spasm. If I am right,—if, that is, a post-mortem rigidity of the non-striped vessel wall is added to the arterial spasm, then the longer the interval since death and the greater the change from post-mortem rigidity to decomposition, the less should be the duration of the spasm. I am not in a position to clear up this important point, but among Anitchkof's material is *Experiment 18*, in which a patient died on Nov. 29th, and the finger was taken for experimental purposes on Dec. 10th—that is, 11 days after death. "There was not complete spasm," writes Anitchkof, yet the finger of the dead body one day later reacted to adrenalin, in a dilution, it is true, of 1 in 100,000—that is to say, a very strong solution.

In summing up the question of spasm of the vessels in a separated ear or finger, I should like to make the following remarks. It is impossible not to regard as classical the experiments of Prof. Kravkof's school on the questions of the revival of vessels and of their survival after the death of the host; but there may possibly be various degrees of physico-chemical post-mortem changes in these vessels which would affect the sensitiveness of the neuro-muscular apparatus of the arteries. One may, and indeed must, note an analogy between the reaction—e.g., to adrenalin of separated ears or fingers on the one hand, and that of the vessels of living beings and live tissues on the

[4] Oppel, V. A.: "Collateral Circulation," Petrograd, 1912.

other; but it scarcely follows that they are to be regarded as identical.

In order to explain what has been said as to the possible lessening of sensitiveness in the neuro-muscular apparatus of vessels of separated ears or fingers, one must have recourse to certain other observations. It is true the latter are not perhaps marked by great clearness, but they do help to throw some light on the question before us.

It may be reckoned that 1 mg. of adrenalin given intravenously is toxic to man. Calculated on the unit of body-weight so as to form an idea of the concentration of the toxic solution, it would seem that one is dealing, in this case, with a solution of adrenalin of 1 in 3,500,000. This is shown by the following calculation: The body-weight is taken at 70 kg., and the weight of the whole amount of blood at one-twentieth of the body-weight—i.e., 3500 g.

It appears, therefore, that a 1 in 3,500,000 solution of adrenalin is toxic to man. Now, turning to the experiments of Anitchkof on separated fingers—and such experiments are especially suitable for comparison with human physiology and pathology—I find that a powerful vaso-constrictor effect is produced by a 1 in 2,000,000 or 1 in 4,000,000 solution of adrenalin, and an appreciable effect by a 1 in 10,000,000 solution; but doses of 1 in 50,000,000 produce no vaso-constrictor effect. It follows that doses which act on the vessels of separated fingers are appreciably toxic.

Adrenalin Content of Human Body.

It would be exceedingly interesting to have even an approximate idea of the concentrations in which adrenalin is found under physiological conditions. According to Popielski, a dog weighing 8·5 kg. secretes 0·1 mg. of adrenalin per minute. Taking the blood (one-twentieth of the body-weight) at 425 g., the dilution of the adrenalin in the blood would be 1 in 4,250,000. There can be no doubt that Popielski's conclusion is contrary to the truth, for a solution of this strength would cause such spasm of the peripheral vessels that they would be completely occluded.

It seems to me that the question may be approached from rather a different side. The calculation I suggest is very approximate, but I can suggest no other. According to Pende, the weight of the suprarenal glands in an adult cat is 1/3000th of the total body-weight. According to O'Connor, adrenalin occurs in the blood plasma of the suprarenal veins in a dilution of from 1 in 1,000,000 to 1 in 5,000,000. If, however, it be assumed (though I may be wrong) that the weight of the blood of the suprarenal glands bears to the weight of the total blood of the body the same ratio as the weight of the suprarenals to the total body-weight, then this ratio must be taken as 1 to 3000; consequently, to form an approximate idea of the concentration of adrenalin in the blood of a cat's body, the concentration in the suprarenal veins must be divided by 3000. I conclude therefore that, under physiological conditions, adrenalin is contained in the peripheral vessels in dilutions of from 1 in 3,000,000,000 to 1 in 15,000,000,000. It follows that adrenalin occurs in the peripheral vesels in excessively weak dilution. The strong solutions used by Dr. Anitchkof on separated fingers represent concentrations such as are found only in the serum of the suprarenal veins—i.e., the strongest concentrations at the very source of production of the adrenalin.

If now, for the sake of comparison, we turn to the separated ears, we find that Dr. V. A. Svietchnikof,[5] in experiments beyond reproach, used, among others, solutions of adrenalin of 1 in 20,000,000 to 1 in 10,000,000 and obtained a vaso-constrictor effect, as compared with Ringer-Locke solution, up to 37–50 per cent. Dr. S. S. Sadovskaia went up to solutions of 1 in a milliard.[6] She also proved that solutions of adrenalin 1 in 1,000,000,000 caused contraction of the vessels of a separated ear up to 4, 10, and even sometimes 43 per cent. It follows that the vessels of a separated rabbit's ear sometimes, but not always, react to relatively very weak solutions of adrenalin. Separated human fingers begin to react weakly to solutions of 1 in 50,000,000. In the last publication of Dr. Shkaver, from the same laboratory of Prof. Kravkof, on Post-Mortem Changes in the Reaction of Vessels of Separated Organs,[7] doses of adrenalin of 1 in 500,000 and 1 in 100,000 are mentioned—i.e., strongly toxic doses.

All that has been said hitherto justifies me further in affirming that the vessels of separated fingers and ears undergo a series of physico-chemical changes; it is beyond doubt that the fresher the ear, the closer should its reactions correspond to the reactions of living vessels; but this question requires further investigation. For the present, I am convinced that the vessels of living tissues react more delicately to adrenalin, and that, in physiological and even perhaps in pathological conditions, separated ears may not react at all or react too weakly to the amount of adrenalin circulating in the blood.

Œdema of the Tissues.

And I am the more convinced of this because in the experiments with separated ears and fingers we are confronted with yet another complication—and that is, the œdema of the tissues.

Prof. Kravkof very happily chose as the object of his investigations the separated ear of a rabbit, but a disadvantage is that it becomes œdematous. As regards separated fingers, Dr. Anitchkof writes:—"In working with separated fingers, the subcutaneous fatty cellular tissue becomes markedly œdematous. . . . . Without exception œdema appears in all separated fingers, causing a constant outflow of fluid in the course of prolonged and numerous experiments." It is evident that the development of dropsy is an invariable accompaniment of experiments on such separated organs. Still, from the clinical point of view, dropsy is always dropsy—that is to say, a pathological condition. Unfortunately, I have not found any explanation of these dropsies in the works of Prof. Kravkof's school, and I am compelled therefore to fall back on my own interpretations for what they are worth.

The œdemas seen in various diseases I divide into two groups: (1) mechanical, (2) chemical. As an example of the first may be mentioned the dropsy resulting from the occlusion of wide sections of the venous system in a definite portion of the human organism; as an example of the second, the local œdema of acute infective processes—e.g., that of anthrax. I admit that clinically it is not always possible to draw a sharp dividing line between these two groups; but in theory I believe that we not only may but must differentiate œdema of mechanical origin from œdema of chemical origin.

It may be asked: Is the œdema of separated ears or fingers to be regarded as mechanical or chemical? For the interpretation of experiments on these organs it would be very convenient if one could show that the œdema occurring in them was of purely mechanical origin. It would be convenient because a purely or almost purely mechanical œdema—within certain limits, of course—does not destroy the receptivity and conductivity of the nervous system and its peripheral endings. This is very simply proved by the experiments of Schleich, carried out on himself and his assistants.

Schleich[8] made the following experiments. He injected into the skin various solutions. Using a 0·6 per cent. solution of NaCl as isotonic, he found that the formation of an œdematous bulla from this solution did not destroy the sensibility of the skin. We know that a 0·6 per cent. solution of NaCl is slightly hypotonic, but nevertheless the dropsy caused by it does not, to any appreciable degree, destroy the sensitiveness of the skin. On the other hand, the injection of

[5] "On the Various Conditions of Action of Adrenalin," Dissertations, Petrograd, 1913.
[6] "On the Action of Proteinogenous Amines on Peripheral Vessels," Dissertations, Petrograd, 1914.
[7] Report of Physiological Discussions held on April 1st, 1922.
[8] Schmertzlose Operationen, Berlin, 1906.

distilled water—i.e., a hypotonic fluid—is always accompanied at first by pain and later by anæsthesia. Hypertonic solutions (3–4 per cent. of NaCl) cause a burning sensation and even a hyperæsthesia of the injected region. "If," writes Schleich, "under comparatively high pressure an artificial œdema of the subcutaneous tissues is produced, the whole area becomes absolutely ischæmic. From the cut tissues not a drop of blood flows," and the tissues themselves become anæsthetic.

To supplement these experiments of Schleich, I would refer to recently published experiments by M. I. Vinogradof,[9] showing the physico-chemical effect of distilled water on nerve trunks. Vinogradof showed that the nerve loses its conductivity in distilled water. But this conductivity is restored if the nerve is immersed in a hypertonic solution. He explains such phenomenon thus: The distilled water causes the nerve to swell; "weakly toxic iso- and hypertonic solutions restore the lost functions of the nerve, reversing the direction of the osmotic process, and causing the nerve to give up the water it had taken up. These osmotic processes are the result of the semi-permeable character of the nerve sheaths.

Ringer-Locke solution is, as closely as possible, isotonic with blood. Consequently the œdema caused by it, a mechanical œdema, should not greatly disturb the sensibility of the peripheral nervous system of the vascular apparatus; the more so that in the tissues of a separated ear or finger the pressure of the œdematous fluid is not very great, and consequently this pressure alone scarcely causes any disturbance in the sensitiveness of the neuro-muscular apparatus.

Still one can scarcely, it seems to me, assert that œdema in the tissues of a separated ear or finger leaves the sympathetic nervous system entirely unaffected, or that it has no effect in lowering its sensitiveness to irritation by toxins, such as, for instance, adrenalin. The more so that, from the point of view of colloidal chemistry, Ringer-Locke solution cannot be regarded as having equal adsorbent powers ("iso-adsorbent") with the substances composing an ear or finger. Dr. N. P. Savitski[10] is, I think, quite right when he concludes that "the œdema is a complex function of the adsorbing powers of the intertissue plasma and in general of the whole mass of tissues on the one hand—osmosis, diffusion, and the filtering permeability of the blood-vessels—and the adsorbing powers of the colloids of the blood on the other."

I willingly admit that the œdema in a separated ear or finger is mainly a mechanical œdema under low pressure, due to the fact that, owing perhaps to the conditions of the experiment, the quantity of fluid flowing in in a unit of time is greater than the quantity flowing out; but I cannot altogether exclude the significance of the physico-chemical processes of the exchange of water between the Ringer-Locke solution and the tissues of the separated organ (ear or finger). But if physico-chemical processes result, if the colloidal substances of a separated ear cause œdema owing to differences in adsorbing powers, I am fully justified in suspecting at least some lowering of the sensibility, receptivity, and excitability of the peripheral sympathetic nervous system in separated ears and fingers.

To sum up, it appears that the initial arterial "spasm" in separated ears and fingers, and the accompanying œdema of the tissues of such organs, compel me to hold that the reaction to adrenalin of the sympathetic nervous system of the arteries in separated organs may be lowered, though the degree of such lowering may be very varied. In affirming this, I do not, it goes without saying, in any way belittle the services of Prof. Kravkof's school. I continue to recognise that those data are exceedingly valuable, but they cannot, and must not, be identified with the reactions in living tissues.

[9] Russki Physiologitcheski Journal, 1912, vol. iii.

[10] "Materials for the Study of Œdemas from the Point of View of Colloidal Chemistry," Dissertations, Petrograd, 1921.

Lowered Sensitiveness in Separated Organs.

I have critically examined a second objection of Prof. Kravkof's school, and I find that it does not refute my theory; for, if the presence of adrenalin cannot be detected in the blood-plasma of so-called spontaneous gangrene cases, this does not imply that it is not there. I believe that one reason for this failure to detect it is a certain lowering in the sensitiveness of the vessels of separated ears and fingers, as compared with the physiological, and especially with the pathological degree of such sensitiveness. The experiments of Sadovskaia have shown conclusively that the vessels of a separated ear which do not contract with a 1 in 1,000,000,000 solution of adrenalin begin to react to it after special preparation—a preliminary passage through them of stronger solutions of adrenalin. If I regard so-called spontaneous gangrene as the result of hyperadrenalæmia, then, on the data of Prof. Kravkof's school, I ought to conclude that the vessels in this disease should possess a heightened degree of sensibility to adrenalin. Dr. Anitchkof, on the basis of his investigations with vessels of arterio-sclerotic patients, came to the conclusion that such vessels react more rapidly and strongly to adrenalin than the vessels of "healthy" subjects. For the building up of my theory this fact would have an immense importance, inasmuch as the vessels in so-called spontaneous gangrene cases should be still more sensitive; but, unfortunately, Dr. Anitchkof's experiments have not completely convinced me of his conclusions. I am obliged, therefore, to refer to the experiments of Sadovskaia, from which one can only surmise the possibility of a heightened sensitiveness to adrenalin in the vessels of so-called spontaneous gangrene cases.

Durability of Adrenalin.

Before passing to the positive proofs of my theory—also, in the first instance, of an experimental character—I must deal with a third objection of Prof. Kravkof's school, concerning the "ephemerality," as Kravkof himself calls it—i.e., the rapid breaking-up—of adrenalin in the blood—so rapid that in the peripheral vessels there is practically none. I have maintained, and still maintain, that there must be adrenalin—i.e., suprarenal secretion—in the peripheral vessels. In order to settle this question, which is of extreme importance for my theory, one must refer to the literature on the subject of the durability of adrenalin. The work of Svietchnikof, referred to above, carried out in Prof. Kravkof's laboratory, shows that "the vaso-constrictor action of solutions of adrenalin in Locke fluid decreases in proportion to their exposure to light at room temperature, and almost ceases after an average exposure of one to two hours, in solutions of 1 in 4,000,000 or 1 in 5,000,000 . . . ." "Heating solutions of adrenalin . . . . up to body temperature for 10 to 15 minutes markedly lessens their vaso-constrictor powers. Such heating for five minutes reduces their powers to 20–80 per cent." As opposed to this, Svietchnikof asserts, on the basis of very careful experiments, that in blood serum the action of adrenalin is not lost after two to four hours, not even after half an hour's heating up to 40°. Above all, "the addition of small quantities of serum (1 in 5000 or 1 in 10,000) to a solution of adrenalin in Locke's fluid delays the breaking up of the adrenalin, even after standing three to five hours at room temperature and after heating it to 40° for 30 to 60 minutes."

Adrenalin and the Circulation.

If the data concerning the breaking up of adrenalin were limited to those just brought forward the question of the circulation of adrenalin in the blood would be very simply decided; the adrenalin secreted by the suprarenal glands would have the power of circulating for a long time throughout an organism before it broke up. But the question is more complicated than this. Biedl says that, after intravenous injection of adrenalin into an animal, "the increase of blood pressure only lasts a short time—from 30 seconds to two or three minutes, according to the dose." . . . "The pressure

remains at a certain height only for a few seconds." From this it is clear—and Prof. Kravkof dwells on this—that adrenalin in the blood of a living animal breaks up more rapidly than outside the organism. This, of course, has its importance. But, even if it be admitted—what is not quite true from the experimental point of view—that the cessation of the vasoconstrictor action of adrenalin that leads to increase of blood pressure is a result of its breaking up, then it would seem that the breaking up of adrenalin in the blood and tissues of a living organism is effected in 30 seconds at the least.

I may be permitted now to recall the following physiological facts. According to Vierordt, the complete circulation of the blood takes place in 23·1 seconds, and according to Loevy-Schroetter in 72 seconds. For the sake of simplicity let us say it takes one minute. From what has been said above it is evident that the shortest period for the breaking up of adrenalin in the blood of an animal may be taken as 30 seconds—i.e., half the time of the blood-circle. It is quite clear, then, that adrenalin poured into the general circulation by the suprarenal veins cannot fail to reach the peripheral vessels. Such a proposition is, I think, confirmed by other facts of pathology.

If intravenous injection of adrenalin is accompanied by an increase of blood pressure, then it is evident that the adrenalin falling into the general circulation and distributed to the peripheral arteries causes them to contract and so increases the blood pressure. To show how far this is true—how far hyperadrenalæmia is possible as a result of hypersecretion of adrenalin by the suprarenals, and to what extent one must recognise the passage of adrenalin from the suprarenal veins to the blood of the peripheral vessels, I may be permitted to refer to the recently published experiments of Drs. V. V. Savitch and A. V. Tonkikh[11]:—

"Between two dogs of the same weight cross-circulation was established by means of special metal cannulæ. The central end of the common carotid artery of one dog was connected with the distal end of the same artery of the other dog. The dogs were under curare and artificial respiration was employed. The left splanchnic nerve was dissected out, cut, and attached to electrodes. The automatic mixture of the blood made no difference to the blood pressure of either dog. Stimulation of the splanchnic nerve in one dog caused a rise of blood pressure first in that dog and then in the other, while in the latter a vagus pulse was sometimes clearly produced. Introduction of adrenalin into the blood of the first dog caused the same phenomena. The rise in the blood pressure in the first dog, caused by stimulating the central end of the sciatic nerve, had no effect on the blood pressure of the second dog."

This experiment is, I think, conclusive. If it shows—the point in which Savitch and Tonkikh were interested—the importance of the splanchnic nerve in the secretion of adrenalin by the suprarenals, it is for me particularly valuable as showing an artificial hyperadrenalæmia resulting from hypersecretion of the suprarenal glands. The conclusiveness of the experiment is increased by the fact that in the second dog the blood pressure rises as a result both of stimulation of the splanchnic nerve and the consequent hypersecretion and of the intravenous injection of adrenalin solutions into the blood of the first dog.

The experiment of Savitch and Tonkikh is convincing as to the possibility of which I spoke on clinical grounds—the possibility, that is, of hyperadrenalæmia as a consequence of hyperfunctioning of the suprarenals. The question, of course, arises: How does this hypersecretion of the suprarenals, expressed by a rise in blood pressure in the second dog, act on the vasoconstrictor powers of the serum and plasma of its blood? The question also arises: Is it possible, and to what extent is it possible, to detect the hyperadrenalæmia artificially produced in a separated ear? The solution of this problem leads us to human pathology, to the theory of gangræna arteriitica suprarenalis. At the present time Dr. M. N. Akhutin is studying this question under the guidance of Dr. Savitch.

[11] Russki Physiologitcheski Journal, 1921, vol. iii.

Personal Experiments.

In the foregoing I have dealt with the criticism and comparison of the literary data. It is time now to pass to certain of my own experimental investigations. These experiments were made jointly with Dr. Akhutin on rabbits. Their object was to compare the sensitiveness of the vessels of living tissues and that of the vessels of separated organs. So far only the roughest experiments have been made, and therefore only the roughest data are available, but they have, I think, a certain importance.

In a rabbit, bound to a table, the femoral or axillary artery is exposed, tied, and on the distal side of the ligature 1 or 2 c.cm. of adrenalin solution is injected; then, to avoid hæmorrhage, the artery is immediately ligatured above the point of entry of the injecting needle. The rabbit is freed and kept under observation. In this manner various solutions of adrenalin are introduced into the peripheral arteries. If 2 c.cm. of a solution of adrenalin in Ringer-Locke fluid, or in saline, of a strength of 1 in 5,000,000, or 1 c.cm. of a 1 in 10,000,000 solution, or even 1 c.cm. of a 1 in 20,000,000 solution be injected into the rabbit's femoral artery, the following is observed: With the weakest solutions the rabbit jumps about, but the movements of the injected limb are slightly delayed. With strong solutions the adrenalised paw gives way when stood upon. By means of contractions of the extensors, however, the rabbit is able to move and direct itself, though with some loss of control over the paw. If the rabbit be lifted by its ear the adrenalinised paw droops. It is clear that the flexor movements of the joints are either lost or weakened. The toes hang immovable. In flexion of the healthy limbs the rabbit moves the toes freely, but those of the adrenalinised limbs are immobile and lifeless.

A still more striking result is obtained if 2 c.cm. of a 1 in 10,000,000 adrenalin solution be injected into the axillary artery, when complete paralysis of the wrist-joint almost always follows. This is shown by the fact that the rabbit, on movement, walks on the dorsal surface of the joint, being unable to straighten it. If the rabbit be lifted by the ear and the fore-paws watched it will be seen that the affected joint does not move and the toes do not stir.

Thus there is complete analogy between the effect of fixed doses of adrenalin solution on the fore and hind paws of a rabbit. It must be noted that the ligaturing of the femoral or axillary artery and the injection of Ringer-Locke or physiological solution into the blood stream produces no such effect.

From these experiments it follows that the introduction of 1 in 5,000,000, 1 in 10,000,000, or even 1 in 20,000,000 solutions of adrenalin into the peripheral arterial system after ligature of the proximal end of the artery is followed by paralysis or in the most favourable cases by paresis of the distal part of the limb. The paralysis is fairly persistent, lasting from one to two or even three hours. However, it gradually lessens, and the rabbit reacquires the power of moving the paralysed paw.

Ischæmic Paresis and Paralysis Caused by Adrenalin.

The question arises: How is such paralysis to be explained? As I have already said, neither simple ligature of the artery nor ligature with injection of physiological solution or Ringer-Locke fluid produces a similar result. Obviously the paralysis can only be ascribed to the adrenalin, and the most important factor is the effect of the adrenalin on the peripheral arterial system. This injection of adrenalin solutions is at once followed by spasm of the artery; this causes stoppage of the circulation, and consequently the distal part of the limb falls into a state of ischæmic paralysis, a condition with which surgeons are familiar. From my own observations, clinical and experimental, I can affirm that ischæmic paralysis comes on when there is an excessive diminution in the arterial blood-flow and when the blood pressure approaches zero. Ischæmic paralysis is on the threshold of ischæmic gangrene; and thus, as a result of injecting adrenalin

solutions into the peripheral arterial system, we arrive experimentally on the threshold of ischæmic gangrene. As was stated above, the ischæmic paralysis of a rabbit's limb lasts some time, but still it passes off, because the adrenalin, it must be assumed, breaks up, and so its effect is lost and the vessels again become pervious to the blood-flow.

I may now pass to the following observation: If I introduce 1 c.cm. of a 1 in 10,000,000 adrenalin solution into, e.g., the axillary artery, this does not mean that I fill the vascular system of that limb solely with the solution of adrenalin. The arteries of the limbs already contain blood, with which the adrenalin solution mixes, and so the concentration of the latter is lessened. It is impossible to say to what degree, but one may form some idea from the following considerations.

Let us assume that a rabbit weighs 2 kg. Its blood (one-twentieth of the body-weight) would be about 100 c.cm. Now, according to Moravitz, the quantity of blood in the vessels of the limbs is about one-fourth of the whole blood: in one limb, then, it will be about 6 c.cm. The tying of the main artery (femoral or axillary) to judge by the fall in blood pressure on the distal side, reduces the arterial blood-supply to the limb by about one-half (vide my "Collateral Circulation"). One may suppose, therefore, that a limb, the main artery of which has been tied, contains about 3 c.cm. of blood. If I add 1 c.cm. of adrenalin solution, it becomes diluted four times, giving a solution of adrenalin of approximately 1 in 40,000,000 or 1 in 80,000,000. If I inject 2 c.cm. of a 1 in 5,000,000 or 1 in 10,000,000 adrenalin solution, I get a solution in the limb of approximately 1 in 15,000,000 or 1 in 25,000,000.

This calculation is, of course, very approximate. It has no pretence to exactness, but in any case it is impossible to deny that a solution of adrenalin introduced into the peripheral arteries mixes with the blood and so in any case becomes a weaker solution than that injected. Inter alia, the facts of which I am speaking—the paralysis and paresis in a rabbit's paw after injection of the above-named solutions of adrenalin into the arterial system—fully justify me in asserting that the figures given by Popielski for the concentration of adrenalin in the blood of animals (1 in 4,500,000) are incorrect. My approximate calculation, given above, which estimates the amount of adrenalin in physiological conditions at 1 in 1,000,000,000 dilution, is nearer to the truth.

However this may be, solutions of adrenalin 1 in 5,000,000 to 1 in 20,000,000 introduced into the arteries of living animals cause local ischæmic pareses and paralyses, due, of course, to very strong spasm of the arteries—so strong as almost to arrest the circulation in the distal part of the limb.

Results with Living and Separated Tissues Compared.

Naturally one desires to compare the results of an experiment on the living animal with that on separated ears or fingers. What do we find? Doses of 1 in 10,000,000 adrenalin in separated fingers (Svietchnikof) cause vascular contraction up to 90 per cent. It must not be forgotten that in a separated ear the whole vascular system is filled with adrenalin solution, while in the limb of an animal this solution mixes with the blood and is therefore diluted: and doses of 1 in 10,000,000 adrenalin introduced into the peripheral arteries cause ischæmic paralysis. In separated fingers, in rare cases (S. V. Anitchkof), doses of 1 in 10,000,000 adrenalin cause vascular contraction up to 100 per cent. Usually with such doses a strong contraction of the vessels is observed, but not up to 100 per cent. Doses of 1 in 50,000,000 in separated fingers cause such a weak contraction of the vessels that one could never believe the development of an ischæmic paralysis to be possible from such concentration.

My experiments, it goes without saying, are not yet absolutely conclusive, but they indicate that living tissues react to adrenalin more energetically than the tissues of separated ears or fingers. They show that concentrations of adrenalin in the blood of approximately 1 in 20,000,000 to 1 in 80,000,000 cause spasm of the vessels approaching 100 per cent.—in any case not less than 90 per cent.—for otherwise no ischæmic paralysis would result. Of this there is no doubt (vide "Collateral Circulation").

To sum up the foregoing: I can with confidence assert that, in human physiology and pathology, one is dealing with solutions of adrenalin in the blood of 1 in 1,000,000,000 (one milliardth)—of such dilutions, that is, as are never reached in the case of separated fingers—at least they have never been shown to be; though they may be in the case of separated ears, firstly after a preliminary salting, so to say, of the vessels of the ear with strong solutions of adrenalin, and, secondly, as a result of an extremely slight contraction of the vessels (4–5 per cent.)—such contraction as can be of scarcely any importance in human pathology.

Conclusion.

In gangræna arteriitica suprarenalis we not infrequently observe a spasm of the arteries causing complete blanching of fingers—i.e., a spasm up to 100 per cent., with ischæmic pains, &c., and this spasm must be ascribed to a comparatively trifling increase in the quantity of adrenalin in the blood of such patients. From my experiments on rabbits above described I assert that, in human pathology, in suprarenal arterial gangrene, the concentrations of adrenalin must be less than 1 in 100,000,000, for concentrations of approximately 1 in 80,000,000 cause ischæmic paralyses, which, if such concentration were maintained, would rapidly end in gangrene of the limb, and not even of one limb but of all four simultaneously. Clinically, nothing of the kind is seen. We know that, in human pathology, the hyperadrenalæmia which I assume to exist only gradually disturbs the nutrition of the arterial walls in the first instance, resulting in a series of pathological changes in them and in the contained blood. Human hyperadrenalæmia must be regarded as a much more delicate process than any of our laboratory experiments. Fortunately we can detect the signs of this hyperadrenalæmia in an increase of the vaso-constrictor effect of the blood serum of so-called spontaneous gangrene cases. But, in separated ears and fingers, which have lost some of their sensitiveness, the conditions are too rough for the detection of hyperadrenalæmia in the blood-plasma. It seems to me, therefore, that the objections of an experimental character put forward by Prof. Kravkof's school are not convincing. True, these objections will compel one to make further investigations and to seek new explanations of important aspects of my theory, but they have not hitherto been able to shake the foundations of my theory. The more so, that clinically the result of treatment of so-called spontaneous gangrene cases by excision of the left suprarenal gland on the one hand, and the pathologico-anatomical data on the other, support my thesis.

LITERARY INTELLIGENCE.—The "Annals of Medical History," the current issue of which we reviewed in THE LANCET of July 1st (p. 23), is published in New York by Paul B. Hoeber: the European agents are Messrs. Baillière, Tindall, and Cox.

CARE OF CRIPPLED CHILDREN.—A national conference of Charity Organisation and Federated Societies, attended by delegates from various parts of the British Isles, was held at Portsmouth from July 3rd to 6th. The need for coöperation between all bodies administering relief, for the training of voluntary workers for citizen service in connexion with statutory committees, and also the care and training of crippled children was discussed. Addresses describing the activities of three institutions for this class of work—viz., the Treloar Home at Alton, the Heritage Craft School at Chailey, and the L.C.C. Special School were given and the results described. In emphasising the need for machinery to deal with these children, it was stated that 40 per cent. of the cases of crippling were due to tuberculosis, 24 per cent. infantile paralysis, 10 per cent. congenital deformities, and the remainder were due to rickets and accidents. The treatment for these cases was at present haphazard, and organised schemes were required. The war and the cripples which it had produced had given an enormous stimulus to orthopædic surgery; in future this would be of great benefit to child cripples.

ALCOHOL INJECTION IN FACIAL NEURALGIA.

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ALTHOUGH it is more than 18 years since Schloesser introduced his method of injection of the deep foramina of exit of the branches of the trigeminal nerve with strong alcohol for cases of intractable tic douloureux, and although his and other modified methods have attracted considerable attention and have been practised widely throughout the world, it is probably only in the hands of the few that alcohol injection can be relied on to give certain relief in cases of genuine trigeminal neuralgia. Unless the injection method is first carefully studied on different skulls and in the post-mortem room it is hopeless for practitioners to expect any good results by this method, invaluable and certain though it is when properly performed. Schloesser's method of intra-oral introduction of the needle and of injection through the mucous membrane of the buccal cavity and pharyngeal roof, though doubtless efficacious as a method of approach to the foramen rotundum or foramen ovale, is repulsive to the spirit of aseptic surgery, and for that reason I have never attempted injection by his route, but have preferred the external route suggested originally by Levy and Baudouin. This I have modified in various details, and it is as a result of accumulated experience during the past 14 years, in over 600 cases, that I can recommend with the utmost confidence these methods.

Recently in America an account has been published of a method for determining the angle and the line of insertion of the needle to reach the foramen ovale or foramen rotundum respectively by means of an instrument based on certain calculations and skull averages. For my part, I am more than sceptical of the value of such a method, owing to the great variations met with in the size and shape of the heads of one's patients. Such measurements, moreover, take little or no account of the variation in the thickness of the fat and subcutaneous tissues of the cheek, so that a stout face with a broad head may require a needle to be inserted for more than one inch deeper than in a thin face with narrow head, in order to reach the foramen ovale. I deprecate, therefore, any rule-of-thumb method unless it is supplemented by an accurate working knowledge of the anatomy of the zygomatic and spheno-maxillary fossæ and their contents, and modified to meet various cases and anatomical differences.

Such knowledge of the local anatomy of the parts concerned should be so familiar to the operator that he can visualise the depths of the fossæ as he is working, more particularly that he shall recognise with absolute certainty when his needle strikes the spine of the sphenoid or the external pterygoid plate, and that he shall know exactly what his needle will reach when he alters its direction either in front or behind these points. Chronic paroxysmal trigeminal neuralgia in the large majority of cases is limited to the second and third divisions of the nerve. Only in exceptional cases is the first division involved, and then never alone, but in addition to the second division. The distribution of the pain in cases of second division neuralgia is often deceptive, and a large number of pure second division neuralgias are liable to be mistaken for neuralgia affecting the first as well as the second division, on account of the pain being so frequently referred above the eyebrow and across the lower part of the forehead and the front of the temple. It is difficult to explain the reference of the pain in second division neuralgia above the eyebrow on an anatomical basis, though pain extending outside the outer canthus of the eye and in front of the temple is frequent, and is probably a referred neuralgia through the temporo-malar branch. This area of skin is also supplied by the auriculo-temporal branch of the third division, and by the supra-orbital branch of the first division: consequently, this area never becomes anæsthetic as a result of destruction of either of these divisions alone. The temporo-malar branch arises from the second division far back in the spheno-maxillary fossa soon after the nerve leaves the skull at the foramen rotundum, even before the sensory root to Meckel's ganglion is given off, and I find in practice that it is of no consequence whether the needle strikes the nerve in front or behind these branches. This fact is in harmony with my view of the pathology of chronic trigeminal neuralgia, that it is due to septic neuritis of nerve filaments of the second or third divisions in the upper or lower jaw respectively, and originated by septic infection from carious teeth, pyorrhœa, antral abscess, and other causes of septic osteitis. Thus, neuralgias of the temporo-malar region, auriculo-temporal, palatal, or lingual branches, are to be looked upon as referred neuralgias, and not primary, and are really due to a primary focus in the upper or lower jaw respectively. Thus, in some trigeminal neuralgias affecting the third division only the pain may be most intense in the tongue, yet division of the lingual nerve is a most unsatisfactory treatment of the complaint, and it is not until the inferior dental branch is also anæsthetised that immunity from pain is secured.

Second Division.

To understand and to practise successfully injection of the second division at the foramen rotundum close study of the route should be first made with an articulated skull, with the lower jaw fixed in position. A long needle (three inches or more) or a hat pin should be passed in front of the coronoid process, and under the malar bone, upwards and backwards at an angle of about 45°. The needle will thus be found to pass behind the backward bulge of the antrum of Highmore, and in front of the anterior border of the external pterygoid plate, through the narrow chink between these two bones known as the pterygo-maxillary fissure, the needle thus entering the spheno-maxillary fossa on its way to the foramen rotundum, which lies about a quarter of an inch deeper than the anterior border of the external pterygoid plate.

The needle can in many skulls be made to rest against the inner lip of the foramen rotundum, and when held in this position, with the shaft of the needle close to the malar bone and anterior border of the coronoid process, it will be seen that the angle of the direction of the needle is nearly 45° upwards from the horizontal, and it will also be seen that the needle is directed towards the point where the ascending orbital process of the malar bone rises steeply from the zygoma. This point can always be felt with the finger and marked with a skin writing pencil on the patient: the anterior border of the coronoid process can also always be made out by pressing the finger under the malar bone and backward to the coronoid process. This point should also be marked with the pencil and a straight line drawn downwards across the cheek joining the two points that have been marked, and it will be seen that a plane roughly at right angles to the cheek through this line will pass through the foramen rotundum, so that a needle entering the cheek through the lower point and directed upwards and backwards in this plane at an angle of just under 45° will pierce the superior maxillary nerve at the foramen rotundum. Occasionally it will be found that the backward bulge of the antrum is so great, and the coronoid process comes so far forward, that the needle cannot be made to pass through the pterygo-maxillary fissure, and it will then impinge either on the superior maxilla or the external pterygoid plate. Indeed, in the anthropoid skulls, such as the gorilla or chimpanzee, this is the normal condition. An alternative route of approach therefore for injection of the second division is necessary. This can be done by sinking the needle through the cheek behind the coronoid process

instead of in front of it, and the most satisfactory point for entrance of the needle is precisely that which I use for injection of the third division at the foramen ovale, to be presently described. Instead, however, of passing the needle slightly backwards, so as to reach the foramen ovale behind the external pterygoid plate, it is directed forwards and slightly upwards, the upward angle being about 15°, and the forward angle varying from 15° to as much as 45°. The necessary forward angle must be determined by trial, the needle being sunk to reach the external pterygoid plate as a landmark, this depth being usually 1⅞ to 2 inches. When this is felt the needle must be manipulated by slightly withdrawing and again advancing the needle, changing its direction gradually forward until its point is felt to slip over the anterior border of the external pterygoid plate. The depth reached on the needle at this point should be noticed, the depth of the external pterygoid plate being a useful landmark, as the foramen rotundum lies almost exactly ¼ inch deeper still. This route of approach causes the needle to strike the superior maxillary nerve rather more anteriorly than by the method previously described in front of the coronoid process, and the point of the needle cannot be made to engage in the foramen rotundum; yet in spite of this in the majority of cases where I have used this route for injection I have obtained anæsthesia of the palate as well as of the cheek and upper jaw, showing that the nerve was hit behind Meckel's ganglion. If the operation is done under local novocain anæsthesia only, or with additional partial morphine anæsthesia, the patient will generally indicate when the nerve is struck by flinching and by complaining of an electric thrill sensation in the side of the nose and upper lip, or, as I have frequently noticed, of a sensation of spray upon the cheek, this more particularly when novocain is injected into the nerve. I use sterilised 2 per cent. solution of novocain when the patient gives this indication, injecting three or four drops, and if the nerve has been correctly punctured anæsthesia of the upper lip can be demonstrated by testing with a pin within 15 or 20 seconds. Keeping the needle in the exact position and quietly changing the syringe, 90 per cent. alcohol is now injected, two or three drops at a time, waiting some half minute or more after each push of the piston, and noting the increasing density of the anæsthesia on the upper lip and nasal septum, until neither pinpoint nor even pressure on the jaw is perceptible. The patient will very likely notice a sensation of swelling of the upper lip and cheek, and of the roof of the mouth on that side, and will be surprised to realise afterwards on looking in a mirror how little change there is. Three-quarters to 1 c.cm. of alcohol will be sufficient to produce this effect, but it is best not to inject any alcohol until anæsthesia to novocain is demonstrable.

While searching with the needle for the second division of the nerve a complication not always possible to avoid is puncture of the internal maxillary vessels, as these pass into the spheno-maxillary fossa by more or less the same route as the needle is taking. With increasing experience I find that this occurs more and more rarely, and it is less liable to occur when the route behind the coronoid process is chosen. In any case care should be taken to manipulate the needle delicately and to avoid lateral movements, the direction of the needle being changed by partially withdrawing it first. The stouter the needle that is used the more danger there is of hæmatoma. Should this occur the needle should be instantly withdrawn and firm pressure applied for several minutes before resuming operations, the needle being meanwhile carefully syringed out with boiled water, as if any blood is left in the calibre of the needle a firm coagulum blocking the needle will occur as soon as alcohol is used. This is, indeed, a trap for the unwary, for unless the piston fits the barrel of the syringe absolutely accurately, which is rarely the case, subsequent injection of novocain and alcohol may be attempted after the nerve has actually been struck by the needle, and yet no anæsthesia results owing to the contents of the syringe leaking back past the piston instead of passing on through the calibre of the needle. Much disappointment may thus arise, and much time may be wasted in searching for the nerve, when a blocked needle is the whole cause of the difficulty. As soon as dense anæsthesia of the upper lip both to pin and pressure and of the nasal septum has been produced, total cessation of the neuralgic spasms is absolutely certain, and the patient can safely be guaranteed a period of many months at least of freedom from neuralgia. Often, indeed, the immunity lasts for years.

Another possible route of approach to the foramen rotundum is from the front along the floor of the orbit, the needle being passed in near the outer angle of the orbit, slightly inwards and backwards along the direction of the infra-orbital canal The orbital route of approach has also been recommended recently by an American author for injection of the Gasserian ganglion, by passing the needle through the sphenoidal fissure. I have, however, no experience of it.

Infra-orbital Injection.

In certain cases of second division neuralgia, especially when the pain may be started by a light touch of the upper lip and side of the nose, injection of the infra-orbital branch alone may be sufficient; I have seen on several occasions total cessation of the neuralgia from such infra-orbital injection persisting as long as four or even five years. This injection is comparatively easy to perform, and though a shorter needle may be used than that required for the deeper foramina I usually use the same. First puncturing the skin of the cheek with a hypodermic needle attached to a syringe with 2 per cent. sterile novocain solution, at a point about ¼ inch outside and above the lower border of the ala nasi, the larger needle is then inserted and directed upwards and slightly outwards so as to enter the infra-orbital foramen, the left forefinger being kept firmly pressed on the lower orbital margin in order to feel the needle should it slip over this ridge towards the orbit instead of under it into the infra-orbital foramen. As soon as the nerve is punctured the patient is liable to feel a thrilling sensation in the upper lip and nose, and injection firstly with novocain will anæsthetise the upper lip and side of nasal septum. As soon as this is recognised by testing, the alcohol syringe is substituted for the novocain, and destruction of the nerve completed with little or no pain. Often the needle can be pushed some ¼ inch or ½ inch along the infra-orbital canal, and the anterior dental branches may then also be anæsthetised, so that the premaxilla may be less sensitive to pressure, but otherwise infra-orbital injection does not abolish sensation to firm pressure upon the cheek although sensation to touch and pin is absolutely lost. The palate, of course, too, is not affected by this injection.

Third Division.

Although the inferior dental is the main source of neuralgia in this branch of the nerve I never attempt to inject it alone, but invariably attack the third division at its exit from the foramen ovale at the base of the skull. As a result it is true that injection of the foramen ovale anæsthetises the auriculo-temporal and lingual nerves as well as the inferior dental, and in addition will cause motor paresis of the masticatory muscles on that side; yet in my opinion the certainty of the injection of the foramen ovale more than compensates for the added anæsthesia and motor weakness, and the period of immunity from neuralgia when the foramen ovale is injected is probably much longer than if the inferior dental nerve alone is attacked. Thus, a female patient had the inferior dental nerve divided by operation, giving her immunity from neuralgia for two years only. After suffering with the recurrent neuralgia for another 12 years, I injected her third division with alcohol at the foramen ovale, and she has now been

completely free of the pain for the past 13 years. Injection of the inferior dental nerve can only be done from within the mouth, where it enters the inferior dental canal in the mandible. Guarded at this point by the spine of Spix on its inner side, it must be extremely difficult, if not impossible, actually to puncture the nerve. It is true that injection of a quantity of novocain solution at this point will gradually infiltrate the nerve and produce anæsthesia of its distribution after the lapse of about 20 minutes, but alcohol, being a tissue fixative, is less likely to infiltrate the nerve, and unless injected directly into the nerve substance is likely to prove a failure. Injection of the terminal cutaneous branch of the inferior dental nerve at its exit from the mental foramen is practically valueless, and I have not used it for many years. It is possible thus to anæsthetise the chin and lower lip, and a slight mitigation only of the severity of the paroxysms may occasionally result.

For understanding the route of approach to the foramen ovale through the side of the cheek it is best again to take the articulated skull, with the lower jaw in position, and to pass a needle through the sigmoid notch in the mandible almost straight inwards and horizontally to the foramen ovale, which can be seen as an egg-shaped slit in the under-surface of the great wing of the sphenoid, and directed downwards, outwards, and slightly forwards. The depth of this foramen from the surface of the skin will vary from 1⅛ in. in a lean face with narrow head to as much as 2⅛ in. or even more in a large square head with thick subcutaneous tissues. Looking again at the articulated skull, a tubercle will be seen on the under-surface of the zygoma and in front of the glenoid cavity. A plane drawn at right angles to the side of the head through the middle of this tubercle will pass through the foramen ovale. This tubercle cannot well be felt through the skin even in a thin subject, consequently I prefer to mark the middle of this tubercle by measurement from a definite fixed point. With a skin writing pencil I mark out the under-surface of the zygoma, which always can be felt. I then measure an inch forwards from the middle of the external auditory meatus, marking this point on the under-surface of the zygoma. This point corresponds as nearly as can be with the middle of the tubercle. Next I draw a line from the incisura notch of the ear forwards towards the lower border of the ala nasi. This line in the average skull corresponds with the bottom of the sigmoid notch in the mandible, which is the lowest point behind the coronoid process at which the needle can be passed into the zygomatic fossa.

A vertical line is then drawn downwards through the point marking the middle of the tubercle on the zygoma, and this line usually crosses the line drawn forwards from the incisura notch at a right angle. In some skulls, however, the auditory meatus is set more above the zygoma than usual, so that the incisura-ala-nasi line slopes downwards, and the vertical line will then not cross it at a right angle. A plane drawn perpendicularly to the zygoma through the vertical line already described will pass through the foramen ovale. Consequently, a needle might be thrust through the cheek at the point where the vertical line crosses the incisura-ala-nasi line, and, passed directly inwards and very slightly upwards, should hit the foramen ovale. However, as the foramen ovale looks rather forward, and the spine of the sphenoid slopes rather steeply outwards as well as backwards from the foramen ovale to join the temporal bone, it will be seen in the articulated skull that a better line of approach to the foramen ovale will be in front from a point somewhat in front of that already described. Consequently, I draw on the skin another vertical line parallel to that already described and a quarter of an inch in front of it, and at the point where this line intersects the incisura-ala-nasi line I insert my needle; its direction now must not be quite straight inwards but very slightly backwards, in order to hit the plane drawn through the posterior vertical line at the correct depth.

As this depth varies with different sized and shaped heads, the line of direction of the needle will vary from 15° backwards to practically straight inwards, and, as I have already said, the depth at which the nerve will be struck at the foramen will be liable to vary by as much as an inch or even more. No vessel of importance is likely to be wounded by this route of injection. The internal maxillary vessels almost invariably turn forwards at a level below the bottom of the sigmoid notch in the mandible, and are consequently safe. Behind the foramen ovale the middle meningeal artery enters the skull at the foramen spinosum, and this vessel may easily be wounded, but it is a small vessel, and outside the skull is of no practical importance. Another much more important structure to avoid is the Eustachian tube, which may be struck by the needle usually at a point slightly posterior to and deeper than the foramen ovale. If general anæsthesia is not employed the patient will generally signify this occurrence by complaining of pain deep within the ear. No injection should ever then be made either of novocain or alcohol, because of the danger of producing middle-ear deafness or even abscess of the middle ear.

As soon as complaint of pain in the ear is mentioned by the patient the needle should be partially withdrawn, and redirected slightly forward. When the nerve is struck by the needle the patient may complain of a thrill or twinge in the chin or tongue, but in probably half the cases no pain may be referred peripherally but may be complained of locally and deep. In such a case, so long as the pain is not complained of deep within the ear, an injection of a few drops of novocain should be made, and if the needle has really punctured the nerve anæsthesia will appear definitely within 20 seconds. If no anæsthesia appears the needle should be pushed an eighth of an inch further inwards, as its point may have just reached the nerve but yet the whole of the needle is outside the nerve, and consequently the novocain does not produce immediate anæsthesia. As soon as definite anæsthesia appears alcohol should be injected, two or three drops at a time, until about a cubic centimetre has been used, before which time total anæsthesia should have been produced. Occasionally there is difficulty in finding the nerve, when it will be a good plan to direct the needle slightly forward in order to hit the external pterygoid plate. This landmark will be a useful indication of the correct depth necessary, as the foramen lies immediately behind the upper posterior border of the plate; the needle should then be slowly worked backwards until its point, so to speak, falls off the back edge of the plate, when the point should be slightly raised by depressing the mount and the needle pressed slightly inwards.

Injection of the Gasserian Ganglion.

As the needle point thus lies within the nerve resting on the inner lip of the foramen ovale, it will often be noticed that after the third division has become totally anæsthetic, as the result of the injection of five or more drops of alcohol, pain is complained of round the eye and perhaps the forehead with each succeeding push of the piston, and rapidly anæsthesia may develop over the whole of the first division, including forehead, eyeball, and cornea; while the second division, as shown by testing the upper lip and nasal septum, is only slightly anæsthetic. This is probably to be accounted for by the alcohol permeating through the root of the third division within the sheath of the Gasserian ganglion, and working its way round into its inner margin. When this occurs I usually wait a few minutes without injecting any more alcohol, and almost invariably after the lapse of five or ten minutes, or even less, sensation rapidly returns to the eyeball and forehead, and within two or three minutes sensation to pinprick and light touch may become perfectly normal

again. This rapid return of sensation over the first division, while the third division remains completely anæsthetic as before, is no doubt to be explained by the alcohol causing a condition of nerve shock in the cells of the inner portion of the ganglion without destroying its substance. If now it is desired to destroy the ganglion, instead of continuing to push more and more alcohol as before, it is advisable to push the needle another one-eighth to a quarter of an inch with a screwing motion through the foramen ovale into the substance of the ganglion. Then very cautiously a drop or two of alcohol is again injected, and if the same resistance to the push of the piston as before is again experienced, it may be assumed that the point of the needle is still within nervous tissue. Drop by drop more alcohol is injected at intervals of about half a minute, while the sensation on the second and first divisions is carefully tested, and usually it will be noticed that now the second division becomes totally anæsthetic before the first division. Perhaps the ideal result to achieve is total anæsthesia of the second and third divisions, with not quite total anæsthesia of the first division, so that pressure upon the forehead and eyeball is at once perceived. When this is the case there is no danger of subsequent keratitis.

Occasionally, after pushing the needle upwards through the foramen ovale, it will be found that the piston experiences no resistance upon injecting a drop or two of fluid, and immediately the patient complains of frontal or even occipital pain. This is due to the point of the needle having passed through the ganglion into the cave of Meckel, and the needle must be at once partially withdrawn and an attempt made to reinsert it slightly further back in the foramen ovale.

First Division.

This division is comparatively rarely affected in trigeminal neuralgia except reflexly through the second division. That is to say, it is quite uncommon for the neuralgic pain to persist from eyebrow to vertex after the second division has been properly anæsthetised at the foramen rotundum. Occasionally, however, neuralgic spasms do persist over the supra-orbital division of the nerve, though I have never known it affect any other portion of the first division. The supra-orbital nerve usually passes through a grove, or even bony foramen in the supra-orbital ridge, at a distance of about one inch from the middle line. The nerve can even be injected at this point by a hypodermic needle fitted on to a small syringe.

Injection under General Anæsthesia.

Injection of the various branches or of the ganglion may be done either after using novocain locally, or under scopolamine-morphine anæsthesia, with novocain locally; or a general anæsthetic may be used, either gas and oxygen, or light chloroform anæsthesia. Scopolamine-morphine anæsthesia is rather apt to make patients uncertain in their answers, and therefore may be misleading. Under either gas and oxygen or chloroform alone the injection cannot be properly guided by the patient's sensations, and the finding of the foramen ovale or foramen rotundum must be trusted somewhat to chance. After inserting the needle in the average direction and to an average depth under light chloroform or gas anæsthesia often a peculiar sharp flinch of the patient may indicate that the nerve has been struck properly. Giving then a few drops of novocain solution I stop the anæsthetic at once and allow the patient to recover, testing the area of distribution of the nerve on the skin, such as the lower lip or upper lip respectively. Presently, as the patient recovers, he will flinch when the pin test is used on the unaffected side; then, if he does not flinch when the pin is tested on the corresponding lip of the affected side, this indicates that the nerve has been properly punctured, and now alcohol should be injected drop by drop as already described. If, however, the patient flinches equally when either side is tested with the pin, then a few more whiffs of chloroform must be given, and the needle readjusted in the search for the nerve, and the process repeated until the required anæsthesia is produced. In this way I have frequently injected both the second and third division under light chloroform anæsthesia through one puncture behind the coronoid process.

Results.

Strong alcohol, being a tissue fixative, coagulates the albuminous elements of the nerve fibres and dissolves the fatty sheath of Schwan. Degeneration downwards of the nerve then results from the point of injection, and the process has been termed neurolysis. Regeneration of the nerve fibre occurs in the ordinary course, and may be more or less complete in two years. In my experience sensation never returns so fully in the third division as after injection of the second division. Freedom from the neuralgia may practically be guaranteed for 12 months, if the nerve has been properly hit, and in the majority of my cases th immunity from pain has been much longer, ranging up to 13 years in the case of third division neuralgia already referred to. Four and five years is a quite common period for the immunity to last in my experience. In many scores of cases in which I have injected the Gasserian ganglion there seems no reason why, in those with total anæsthesia, the cure may not be as permanent as in cases of complete gasserectomy or resection of the sensory root behind the ganglion, though the injection operation is infinitely less severe, and is practically free from risk when done by an expert, though, I repeat, it is not an operation to be attempted until considerable experience of the method has been gained.

VENOUS ANGEIOMA OF THE CEREBRAL CORTEX,

WITH REPORT OF A CASE.

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ANGEIOMATA of the cerebral cortex are among the rarest of brain tumours. Most of the cases recorded have been examples of plexiform arterial angeiomata occurring in connexion with the cerebral arteries. Thus, Drysdale[1] reports two cases of arterial angeioma on the surface of the anterior lobe of the cerebrum connected with the anterior and middle cerebral arteries; D'Arcy Power[2] records a similar condition situated over the angular gyrus, and further cases are reported by Kalisher, Emanuel, Bergmann-Oppenheim,[3] and Simmonds.[4] A few cases of circumscribed cavernous angeioma have also been described—notably by Bruns, Oliver, Stuppler, and Bielschowsky. Cerebral angeiomata consisting entirely of veins, however, are apparently even rarer than either of the above-mentioned conditions; consequently, the following case of extensive venous angeioma of the right cerebral cortex, associated with mild hemiplegia and epileptic attacks of the Jacksonian type, is of considerable interest. Curiously enough, a somewhat similar example of venous angeioma in a younger subject, but consisting of vessels of smaller calibre, occurred in the same hospital a few weeks earlier, and has been recorded by Harry Campbell and C. A. Ballance.[5] D. M. Greig[6] also has recently reported a case associated with hemiplegia, epilepsy, and adenoma sebaceum, in a youth aged 18.

Description of Case.

A. J. A., age 31, was first seen by one of us (C. W.-D.) on August 13th, 1920, his complaint being one of "epileptic fits" and slight weakness of the left arm and left leg.

History.—A. J. A., enlisted in the Navy in 1914, and served afloat as a cook until 1916; he then began to experience occasional attacks of "tingling" on the left side of the face. After four months each attack was followed by transient loss of consciousness; this in turn was succeeded by powerlessness in the left arm and leg. The attacks continued to occur at intervals of about four weeks, and finally, at the end of 1916, led to his being admitted to hospital. Here, he states, he improved and was able to return to duty for a few weeks, but then relapsed and was invalided from the Navy as a case of ? disseminated sclerosis in March, 1917. The attacks continued to occur at irregular intervals up till the time of his coming under our observation in 1920. There was no history of previous illnesses or trauma, and no family history of epilepsy or other nervous disorder.

Condition on Examination (August 13th, 1920).

Symptoms.—The "fits" occur at intervals varying from a few weeks to a few days, and the patient states that he has had as many as four in one week. The attacks are usually preceded by an aura of nausea, vertigo, tingling in the left side of the tongue and face, and occasionally diplopia; he then loses consciousness, falls, and has been told he "goes bluish." Sometimes he realises that his left leg is twitching before he loses consciousness. The actual fit lasts a few minutes; when consciousness is regained he finds that the left arm and leg are powerless and numb and that he has difficulty in speaking; this state continues for about three hours following the fit and then passes off. During the attack his tongue has rarely been bitten, and enuresis has not occurred. Apart from the attacks, he complains of some degree of weakness in the left arm and leg, and occasional frontal headache. There is no vomiting or failure of vision.

Physical Signs.—Pupils moderate in size, equal, and reacting normally both to direct light and consensually. Optic discs normal. No nystagmus; ocular muscles normal. All other cranial nerves, including face, tongue, and ears, normal. Sensation: no abnormality detected. No astereognosis. Left hand-grip distinctly weaker than right, but all movements present in left arm. No wasting. No incoördination of arms; no intention tremor. Left wrist, supinator, biceps and triceps jerks all greater and brisker than those of right. Abdominal and epigastric reflexes fairly brisk, but right greater than left. Gait: left leg slightly spastic, and thrown slightly outwards in walking. All voluntary movements of left leg are performed; no wasting. Knee-jerks brisk, left greater than right. Ankle-jerks brisk and about equal. Plantar reflexes: right, flexor; left, indefinite; flexor response on stimulation of inner side of sole and extensor on proceeding towards outer side of sole. Babinski's second sign positive on left side. Pulse: 76. Heart normal. Blood pressure 130 mm. (systolic). Urine: No albumin, sugar, or casts. Sphincters: normal.

Diagnosis.—A diagnosis of "lesion (? nature) of the Rolandic area of right cerebral cortex, with Jacksonian epilepsy" was made and the patient referred for further investigation and observation.

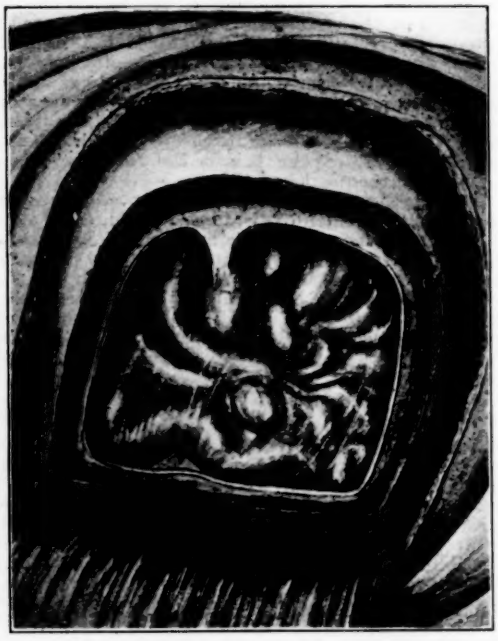
The blood yielded a negative Wassermann reaction. The cerebro-spinal fluid showed no lymphocytosis and both the globulin and Wassermann reactions were negative. X ray examination showed no abnormality of the skull.

Subsequent Progress of Case.

From August, 1920, the patient was taking 15 gr. of sodium bromide daily; up till April, 1921, the attacks averaged only one or two per 14 days, and several consisted only of numbness and twitching in the left arm and leg, and were not accompanied by loss of consciousness. Throughout this period there was no definite change in the physical signs; the left plantar response continued to vary, being at times flexor and at other times extensor. After April, 1921, however, the attacks increased in frequency and averaged three or four a week, about one in three being accompanied by loss of consciousness.

Admission to Hospital.—In July, 1921, the patient was admitted to St. Katherine's Hospital, Regent's Park. The only changes from the physical signs noted on August 13th were: slight left-sided weakness of lower half of face (upper neurone type); left knee-jerk apparently brisker than formerly, and considerably greater than right; presence of left-sided ankle-clonus. The left plantar reflex was more definitely extensor. On Oct. 7th the patient was seen immediately after an attack. He was getting out of bed when a "shivering attack" occurred, and the left arm and leg became useless. When seen a few minutes later, he appeared semi-stuporous and exhibited a flaccid paresis of the left arm and leg; the pupils reacted to light, there was no squint, reaction occurred to pin-pricks applied to the left arm and leg, and the left plantar reflex was extensor. Five minutes later consciousness was normal, but the patient said the left arm felt weak and numb and the tongue seemed swollen. As the lesion appeared to be progressing, although very slowly, it was decided to explore the right Rolandic area.

Operation.—(C. A. B.) Nov. 19th. Under intra-tracheal ether a rectangular flap on the right side of the head was turned down and a quadrangular piece of bone (2½ in. by 2½ in.) removed; the plan was to expose the lower two-thirds of the Rolandic area. The dura was tense, dark, and thin, and large veins were the apparent cause of the bulging of the membrane. The dura was then opened and on being reflected the whole of the cortical area exposed by the removal of the piece of bone was found to be occupied by enormous veins, as shown in the illustration, the



Drawing of the operation area (somewhat reduced in size). A portion of the sagittal suture is visible above, and part of the fronto-parietal suture is visible in front. At one place a firm adhesion is shown between an enlarged vein and the dura. The enlarged veins cover the cerebral cortex.

arachnoid being stretched over them; some of these veins were of a size almost of the little finger. The walls of the veins appeared very thin and at several points were adherent to the dura mater; during the reflection of the latter, rupture occurred at some of the sites of adhesion, the hæmorrhage being controlled with gauze plugs (five in all). Owing to their large size and to the fact that all disappeared beneath the margins of the bone bounding the opening, no attempt could be made at separation or removal. On depressing the tumour and brain along the sides of the craniectomy opening it was seen that the angeioma extended far beyond the limits of the opening in the skull.

The patient stood the operation extremely well and was conscious within one and a half hours of its termination.

Further operation.—A week later a further operation was performed, the flap being turned down, the cortical surface cleared of blood-clot, and the gauze plugs removed. The veins were not thrombosed and appeared somewhat less prominent than a week previously. A celluloid plate was cut to fit the opening in the bone and fixed in position with small tacks.

The patient made an excellent recovery from the effects of the operations, only complaining of occasional headache. He had one attack of epistaxis. Since the last operation up to the time of writing (five months after operation), no definite seizures have occurred; on four occasions only he has experienced slight numbness of the left arm and hand, passing to the left side of face. The physical signs remain practically as before, excepting that no left-sided facial weakness is demonstrable and the left arm and leg appear stronger.

Remarks.

The features in the case worthy of note are: (1) The sensory aura beginning in the face; (2) the absence of any change in cutaneous sensibility; (3) the absence of optic neuritis; (4) the extremely large size of the veins forming the angeioma; (5) the marked improvement following operation—presumably due to relief of local pressure.

As the condition is undoubtedly congenital, it is remarkable that the increase in size to which all angeiomata are liable was insufficient to produce symptoms until the age of 27. In Campbell and Ballance's case, symptoms began at the age of 13, and in Greig's case at 3 years. Cutaneous sensibility, stereognostic sense, and other forms of sensibility were diligently tested on several occasions, but no abnormality was ever detected, which, in view of the extent of the angeioma, is noteworthy; in this particular it also differs from Campbell and Ballance's case. In Greig's case no sensory changes are mentioned.

All three cases show the following features in common: (1) First symptom epilepsy with relatively slow development of hemiplegia; (2) the presence of epileptic attacks of the Jacksonian type, preceded by a definite aura; and (3) the absence of optic neuritis.

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THE INTESTINAL FLORA

AS REVEALED BY THE USE OF A NEW CULTURE MEDIUM.

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THE belief that many medical disorders owe their origin to, or are at least seriously aggravated by, an abnormal state of the gastro-intestinal tract is very widely held. Such terms as "intestinal toxæmia" and "intestinal auto-intoxication" are admittedly unsatisfactory and open to abuse. So long, however, as this is clearly recognised, and every effort is made to investigate critically the clinical facts encountered, terminology is not after all a very important affair. A little reflection on medical nomenclature in general suggests that the terms employed to designate most common diseases are of doubtful value, since they tend to focus the attention of the practitioner on one particular organ or tissue, whereas the changes in that particular tissue or organ are really *end-results* of some diseased process.

In the production of symptoms to which the diagnosis of "intestinal toxæmia" may be appropriately applied, many factors other than bacteria have to be taken into consideration. While this is kept in view, there is no reason to doubt that conditions of the intestinal bacterial flora are of first importance. The following note is not written from the point of view of the bacteriologist but from that of the clinician, in an endeavour to apply elementary facts of bacteriological science to the routine investigation of every-day diseases.

In the last few years I have devoted considerable attention to the study of Gram-stained films made from the intestinal excretion. These films have been made either from the stools direct or from the results of an enema, or from the result of the second washout of the bowel after the administration of a preliminary enema, each injection consisting, as a rule, of 2½ to 3 pints of plain water. I have sought to determine what deductions, if any, could be drawn from their study relative to the disease of the patient or its treatment. I have also taken many opportunities of getting as much assistance as possible from bacteriologist friends, who have generously assisted me with opinions based on their own individual experience, or that recorded in the literature of the subject. The great limitations of our knowledge of the subject preclude the too ready drawing of conclusions from this limited line of study. The only definite conclusions that I have drawn are that: (1) At present we have very little exact knowledge of the intestinal flora in its relation to the common serious disorders met with in every-day practice; and (2) the commonly accepted view that a large proportion of the organisms normally present in the fæces are dead, requires revision.

It is only right to refer to the increasing attention that has been drawn in recent years to the probable rôle of members of the streptococcal group (Gram-positive) as a cause of disease in the bowel and in the remote tissues. From the point of view of the clinician, however, one is sometimes tempted to think that extreme specialisation in bacteriological research may sometimes be a hindrance rather than a help in the search for fundamental truths.

In the past two years I have endeavoured to supplement my knowledge of the subject by the use of simple cultural and other methods of investigation carried out in a laboratory in immediate relationship to my wards. My present object is to draw attention to the results of these preliminary investigations. In my view such problems require the closest possible study alike by clinicians who are interested in bacteriology and by expert bacteriologists with more intimate knowledge of advanced research work. I have expressed above the view that the prevailing teaching on one fundamental point requires revision. It has long been known that the examination of a Gram-stained film from the stools of the average hospital patient or an apparently healthy person reveals a flora which differs widely in different cases. An average case reveals enormous numbers of Gram-negative organisms of a coliform type and very large numbers of Gram-positive organisms of a coccal, diplococcal, or bacillary form. The proportion of these varies widely in different cases. When the media commonly employed for the investigation of these general cases is inoculated from the stools an abundant growth of Gram-negative organisms of a coliform type is obtained. In not a few cases it may be obtained in pure culture; in others a few Gram-positive cocci and bacilli are present in the film. It is, in my experience from a large number of cases, rare to find the proportion of Gram-positive organisms exceeding 5 per cent. of the total number. This fact has led to the current teaching that a large proportion of the bacteria in the fæces are dead. This teaching is well expressed by Hurst in his book on constipation, where he speaks of "the vast number of dead bacteria present in the fæces." In my opinion this teaching requires revision, for reasons to be shortly stated.

A study of films from a series of cases extending to many hundreds, and more especially their consideration in relationship to the different diets in use, prompted the suggestion that possibly the bacteria did not grow simply because the cultural conditions were not such as facilitated growth. It seemed to me possible that, by restricting the culture-media to broth, agar, and their various modifications in common use we were failing to take a sufficiently wide outlook on the nutrition of bacteria and its relation to varying conditions—dietetic and other—in the intestinal tract. In this connexion it is of interest to note that Metchnikoff in writing on this subject referred to the importance of acquiring new media for investigation. In order to test this view I made a series of comparative investigations in which the cultural results obtained by the use of broth, agar, glucose agar, &c., were compared with those obtained by the use of a medium of plain milk. In ordinary medical bacteriology milk is not commonly employed as a culture-medium, though its value in differentiating organisms of the coliform type by chemical tests has long been established. I found that certain organisms of a coccal and bacillary form grow in fair profusion in milk, that are not revealed or are only very sparsely revealed by the ordinary cultural methods. This result confirmed my general impression as to the

importance of studying bacterial action as far as possible in relation to actual conditions obtaining in the intestinal tract. As milk is not a very suitable medium to work with, its use in that form was abandoned, and attempts were then made to combine milk with agar, as it was believed that by some such formula as that at which we have arrived we could more nearly reproduce the nutritive conditions prevailing in the intestinal tract. After an extended series of observations I found that a medium prepared according to the following recipe yielded uniformly a striking result. Special care must be taken in regard to the acidity of this medium at the different stages of its preparation.

Saccharose Milk Agar.

Make ordinary broth (using bullock's heart):—

Meat extract	1000 c.cm.	1000 c.cm.
Peptone	10 g.	
NaCl	5 g.	

Evaporate above down to one-fifth original bulk (i.e., down to 200 c.cm.), make up to original bulk (i.e., 1000 c.cm.) with whole milk; autoclave at 115°–120° for 15 minutes; filter when cold through gauze (6 folds); the reaction is next tested and shows excess of acidity due to the addition of milk. Neutralise very carefully by the addition of 10/N NaOH and add agar 2 per cent. and saccharose 2 per cent. Autoclave as above for 15 minutes. Adjust acidity to plus 5 Eyre's scale. Filter as above. Tube. Again autoclave. Slope. (Certain objections which may, on theoretical grounds, be raised as to the effects of the application of heat to the carbohydrate in the media, may, in view of the practical results, be disregarded.)

N.B.—In the test-tube the medium presents an appearance somewhat similar to blood serum—with a surface rather granular, and a tendency to albuminous deposit. Occasionally minute droplets of fat are observed on the surface of the medium. With a little experience of the medium there is no difficulty in differentiating a true growth. In comparing the results from the various culture-media special precautions were taken to see that a truly representative film was obtained. In each case the cultural growth was thoroughly mixed on the surface prior to making the film. The films from the different media employed—agar, glucose agar, and the new medium—were invariably stained on the same slide. It was found that a striking change in the nature of the flora could usually be determined by the unaided eye; the films made from the new medium presenting a distinctly bluish tint in contrast to the reddish tints of the other films.

The Medium Apparently Selective for Intestinal Bacteria.

Many experiments have been made with the object of clarifying the medium. The results of these experiments, however, have shown that in the process of clarifying, the filtration removed some of the nutritive properties—albumin and fat—of the medium. In practice it will be found that increasing experience in the preparation of this new medium adds greatly to the success of the results. By the use of this medium it is found that in contrast to all the media in common use for primary culture, the growth of Gram-positive organisms, mainly of streptococcal form, increases from an average of 5 per cent. or less up to an average of 45 or 50 per cent. Whereas, by the use of the ordinary media it is not, in my experience, possible to produce a film which even remotely corresponds to the original smear of the stool, the use of this saccharose-milk-agar medium provides a film which compares favourably with the original smear. If that is so, it seems clear that such a medium may have many advantages. The medium is, in my experience, to an important extent selective for intestinal bacteria. Some additional facts have been learned from day-to-day cultural observations carried out for many weeks with the new culture-medium in comparison with the commonly employed agar preparation. The results are interesting and confirmatory of the above findings.

Characteristic results are as follows: Primary culture on the new medium from the stool in a case of chronic colitis yielded Gram-positive organisms in the proportion of 80 per cent. and Gram-negative organisms in the proportion of 20 per cent., the corresponding cultures on ordinary agar yielding similar organisms in the proportion of 5 per cent. positive and 95 per cent. negative. Fresh cultures were made daily as outlined on the charts.

These results are striking. An additional point of interest is that this new medium is admirable for revealing the presence of yeasts. Little is, I believe, known with regard to the presence and clinical significance of yeast organisms in the different parts of the digestive tract. In my experience the ordinary agar media seldom reveal their presence; this new medium frequently reveals their presence, sometimes in extraordinary profusion. They die out comparatively rapidly in the cultures when transferred from the new medium to ordinary agar. The crosses on the two charts indicate the appearance, gradual increase, and apparent disappearance of yeast organisms in the daily cultures. Further, if daily cultures are made alternating from one medium to the other,

CHART 1.

Note.—In both charts O = ordinary agar, N = new medium. Continuous line = Gram-negative coliform bacilli; dotted line = Gram-positive organisms, almost exclusively streptococcal. The crosses indicate appearance, gradual increase, and apparent disappearance of yeast organisms in the daily cultures.

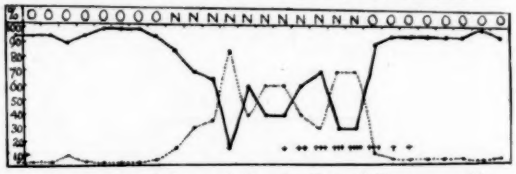

Chart illustrating daily variation in the relative proportion of Gram-negative organisms of coliform type and Gram-positive organisms, chiefly of the streptococcal variety, when subcultured daily on (*a*) ordinary agar (7 days); (*b*) transferred to new medium (11 days); and (*c*) retransferred to ordinary agar (8 days). The culture, which is made from the fæces, reveals the presence of—on ordinary agar—over 95 per cent. Gram-negative organisms and under 5 per cent. Gram-positive organisms. Observe the effect of the new medium in increasing the number of the Gram-positive organisms, and the corresponding diminution in the Gram-negative. Observe also the favourable influence of the new medium in revealing the presence of yeasts (+). Cf. Chart 2.

CHART 2.

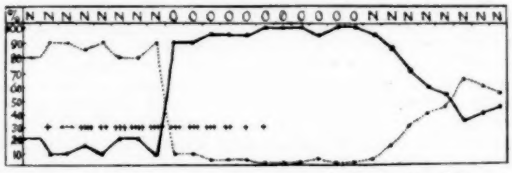

Chart illustrating two graphic curves showing the effects of daily subculture for 27 days, (*a*) on the new medium (7 days); (*b*) transferred to ordinary agar (11 days); and (*c*) retransferred to new medium (8 days). Observe the effects of the media on the two varieties of organism. Note also the favourable influence of the new medium in revealing the presence of yeasts which later disappear on the ordinary agar culture. Cf. Chart 1.

a characteristic curve is obtained illustrating the immediate effects of the transference, the Gram-positive organisms of the streptococcal group appearing in profusion on the new medium and diminishing very markedly on the following day when transferred to ordinary agar, the curve of the Gram-negative organisms running in the opposite direction.

Changes in the Morphological Appearance of the Organisms.

Attention was directed to the alterations in the shape and size of the organisms observed throughout these investigations. Changes in the size and general appearance of *B. coli* under different culture-media are well known, but it is doubtful if we sufficiently realise the possible significance and importance of these changes. In the present series the changes in the morphological appearance observed may be briefly summarised.

On the new medium (see Chart 1) *B. coli* tend to be very much larger, being on an average at least double the size of *B. coli* obtained from the same stool cultivated on ordinary agar. When transferred to ordinary agar they are very much smaller in size and when retransferred to the new medium they again tend to increase materially in size; yeasts, already referred to, are scanty in numbers in the first culture and rapidly increase so long as subcultured on the new medium. When transferred to ordinary agar they rapidly decrease until they disappear or their presence is not revealed.

In Chart 2 corresponding results are revealed as regards the morphological appearance of *B. coli*, the bacteria being notably small on ordinary agar and notably large on the new medium; in this chart it is similarly interesting to observe the late appearance of yeasts in the new medium under the conditions described, also their rapid increase and their apparent rapid disappearance when transferred to ordinary agar.

The further consideration of the nature and clinical significance of the altered proportion of organisms thus revealed, and also their differentiation, is beyond the scope of the present communication. I am satisfied that the new medium, while definitely favouring the growth of streptococci, does not inhibit the growth of coliform organisms. In a later paper attention will be directed to the influence of the new medium under anaerobic conditions. The practical importance of the data is suggested by a consideration of the fact that at the present time vaccines prepared by culture from the stools are extensively employed in the treatment of a variety of diseases with varying results; these are ordinarily prepared from the organisms which grow on the media in common use. My experience in this direction leads me to think that in many instances in which there is a profound derangement of the normal flora, the cause is to be found in relation to the bacteria which do not readily grow on the ordinary media but are revealed by the use of the new medium.

There are many questions of a nature more purely bacteriological, and also clinical, raised by these findings; their solution will necessitate much further investigation. The possible significance of variations in hydrogen-ion concentration of the media has not been overlooked. My main object has been to draw the attention of bacteriologists and others to the facts recorded, with the view of stimulating investigation along lines which I am satisfied will prove of value in elucidating the wide and important subject of intestinal toxæmia.

I have pleasure in expressing my indebtedness to my laboratory assistant, Mr. John Linklater, for his valuable assistance in these investigations.

Medical Societies.

THE MEDICO-LEGAL SOCIETY.

ACUTE ARSENICAL POISONING.

A MEETING of this Society was held at the rooms of the Medical Society of London on July 4th under the presidency of Lord Justice ATKIN, when Sir WILLIAM WILLCOX read a paper on Acute Arsenical Poisoning. He said this subject had always been of great interest and importance to the medical and legal professions. During the last few years our knowledge of the physiological, therapeutical, and toxicological effects of arsenic had been greatly extended, owing largely to the much increased use of preparations of arsenic in the treatment of disease, such as arsenobenzol derivatives in the treatment of syphilis, while other arsenical compounds were used in pharmacology. In some cases toxic effects had followed when the substance had been used therapeutically. The extended use of arsenic had also stimulated a careful study and review of various quantitative tests for the degree of efficiency of such organs as the liver.

Recent Advances in Knowledge of Arsenic: Risk from Domestic Employment.

Arsenic was one of the commonest and oldest known poisons; it was believed to have been discovered in the third century. Everybody knew of its poisonous properties, and preparations of it were easily accessible. It was almost tasteless, and could be introduced into food without fear of it being detected by those taking it. As the symptoms following closely simulated those of disease, it had been a favourite homicidal poison for centuries. Poisoning by arsenic might be homicidal, suicidal, accidental, might follow an attempt to procure abortion, or might result from taking quack remedies. Of 1000 cases of arsenical poisoning collected between the years 1752 and 1911, 42 per cent. were homicidal, 23 per cent. suicidal, 20 per cent. accidental, 3 per cent. were cases in which the drug was taken as an abortifacient, and in 10 per cent. the motive was not ascertained. But these figures could not express the true proportions, as the suicidal and accidental cases were not usually reported. For criminal purposes the most common preparation used was arsenious oxide, a white, inodorous powder, almost tasteless, and slightly soluble in water, and it could be added to food without fear of detection. It was required to be coloured by soot or indigo before being sold, but sometimes, as in the recent Armstrong case, this was not carried out. The poison could be obtained from wholesale firms for laboratory purposes almost without restriction, and it was available to all and sundry who used or passed in and out of such laboratories—a source of possible supply not usually paid attention to. Arsenious oxide was sold in combination with sodium hydrate or carbonate as weed-killer; it might be a strong solution of sodium arsenite. The liquid preparation was usually coloured by the addition of an aniline dye, such as fluorescine. "Ureka" weed-killer was mentioned in the Greenwood case, and a sample of that brand contained 60 per cent. arsenious acid. It was very soluble in water, and formed a pinkish-red solution, which was decolorised by acids. In the case of Rex *versus* Bingham, 1911, three fatal cases of arsenic poisoning were inquired into, and they were found to have been due to weed-killer. Liquid preparations of arsenic were used to kill insects which infected and destroyed the strength of timber, and as these were not coloured there was danger of unwitting poisoning; a hut which had been so treated was found to exude a white powder which was found to be arsenic. Sheep dips also contained this poison. Arsenate of lead solutions for spraying fruit were also a potential danger; Sir William Willcox had had cases due to this under his care, and urged a reconsideration of the conditions of their sale as a protection against danger to the general public. Also, especially when large doses were given, the risk of arsenical poisoning from taking medicinal preparations could not be left out of account.

The Symptoms of Poisoning by Arsenic.

Arsenic had been described as an irritant poison, but death from it was not directly due to its irritant effects on the gastro-intestinal tract; it was a very powerful tissue poison, and the fatal result was due to its toxic effect on the important organs of the body—heart, kidneys, liver in particular. The vomiting and diarrhœa, which *per se* were rarely the cause of death, and could be easily controlled by medicinal care. The symptoms of arsenical poisoning varied a good deal as to their sequence and the period of their onset, hence no rigid rule could be stated. A toxic dose of arsenic might in one person cause vomiting first and diarrhœa afterwards, but in another the order might be reversed. Some might complain of a burning in the throat and cramps in the legs, while in others these might be absent, though a similar dose had been taken. In some criminal cases a

succession of sub-lethal doses had been given, each definitely poisonous; here the symptoms which would be expected to follow one large dose would be somewhat masked by the symptoms of subacute or chronic poisoning. When one or two grains were taken by the mouth nausea was usually the first result, and it might occur within a few minutes of taking the poison. The time of onset of the symptoms depended on the state of the stomach when the poison was taken. If it was empty, symptoms would quickly follow; if a meal had just been taken, or if the arsenic was in a solid form, symptoms would be delayed. Sir William Willcox related one case in which 180 grains were accidentally taken in milk; diarrhœa and purging followed, and these symptoms were treated, so that death was postponed until 3½ months after the arsenic was taken, showing that the main action had been that of a protoplasmic poison. A worker in the laboratory of a weed-killer firm sometimes had diarrhœa and vomiting at night, no doubt due to the inhalation of minute quantities of arsenic throughout the day. As arsenic was not a corrosive poison it was difficult to account for burning in the throat, except by reflex action. The vomited material would contain food and mucus, sometimes an admixture of blood; occasionally it was yellow, owing to the presence of bile. Pain and tenderness in the abdomen were followed by a profuse evacuation; the stools were watery, and might contain small quantities of mucus and blood. In cases of suspected poisoning, the stools should be carefully preserved for analysis. In the early stages the tongue was furred, and later might have a silvery appearance. After repeated administration of the poison sordes might appear on the lips. The vomiting and diarrhœa would produce great thirst, and the face might become so pinched-looking that there was some resemblance to a case of cholera. One of the earliest and most constant symptoms was a weak and rapid pulse. Both Mr. Martin and Mrs. Armstrong, in the recent Armstrong case, suffered from tachycardia. This was accompanied by a feeling of faintness and of impending collapse. Sir William Willcox said that arsenic had a direct action on the cardiac muscle, and that was a reason of early death in acute cases. It was also a direct liver poison, and in fatal cases of this kind the organ showed marked fatty degeneration. One function of the liver was to protect the body from the effects of any circulating poisons; hence in bearing the brunt of the attack in a case of arsenic poisoning it was often irreparably damaged. Jaundice was not a common symptom of acute poisoning by arsenious oxide, but it was likely to occur where the doses of poison had been extended over some weeks. Acute yellow atrophy of the liver might follow the poisoning. Many cases of salvarsan jaundice had now been recorded, and it was evident weeks, even months, after the administration of the salvarsan. After the clearing up of the jaundice the liver was usually left shrunken, arsenic causing hepatic degeneration. There was also albuminuria, and in one case examined there was definite arteriosclerosis of the kidney. The lead in some fruit-sprayers accelerated the renal symptoms.

When salvarsan was first introduced, there were a number of deaths from it, and they resembled death from uræmia. Nerve symptoms did not result from a single dose of arsenic unless it were a large one; then multiple neuritis might ensue. The latter was frequent in cases in which there had been smaller and repeated doses of the poison. Not only was very little arsenic found in the brain in these fatal cases, but the mental condition was usually unimpaired until a few hours before the end. When cerebral symptoms occurred they were due to auto-intoxication.

Fatal Dose and Fatal Period.

A single dose of 2 gr. of arsenious oxide had caused death in a healthy adult, and this was usually accepted as a possible fatal dose. It was common for much larger doses to be taken and recovery to occur, due no doubt to the rapid elimination of the poison by vomiting and diarrhœa. A certain quantity of arsenic if given in solution and spread over a short period in its administration was much more likely to prove fatal than the same amount taken in one dose. It was impossible to state what was the fatal period, as so many factors influenced it. Usually the end came in three days, but in a case of repeated small doses, death might be postponed for many days. In one case death occurred 20 minutes after the taking of a large dose, whereas in another, after a dose estimated at 180 gr., death did not occur for 3½ months.

Post-Mortem Examination.

Dealing next with post-mortem examination, Sir William Willcox said that in cases in which poisoning had occurred for some time previously, careful search must be made for evidences of delayed putrefaction. But too much importance must not be attached to this sign, for when death had quickly followed the taking of a large dose there might be very little delay in putrefaction. Signs of inflammatory trouble in stomach and intestine, and especially petechial hæmorrhages, should be looked for; there might be no such evidences when death had taken place several days prior to the examination. He stated the precautions which should be observed when sending viscera and portions of organs for examination in suspicious cases; each should be placed in a separate vessel, and the cæcum and other portions of intestine should be sent ligatured to prevent escape of contents. A portion of muscle, a piece of bone, some hair cut off close to the scalp, a portion of skin and the nails should be separately preserved. Any fluid in the coffin in an exhumation case should be kept, also any earth adherent to the coffin.

Chemical Tests.

He then proceeded to deal in detail with the chemical tests for the presence of arsenic. The Reinsch test he regarded as the best for qualitative purposes. Where a weighable quantity of arsenic was available, the sulphuretted hydrogen test was to be preferred, and for minute amounts the electrolytic Marsh Berzelius test gave excellent results. But toxicological work should not be confined to one test, nor should a conclusion be based on examination of one viscus. Numerous examples had occurred where the origin of arsenic found in the process of analysis of viscera was found to be the impure chemicals used.

Elimination of Arsenic.

In acute arsenical poisoning the vomit and fæces contained arsenic in amount depending on the quantity of the poison taken. As to the blood, 0·5 mg. of arsenic had been found in 100 c.cm. of blood after giving salvarsan, and the urine continued to contain it for 14 days after the drug was given. After considerable doses of arsenobenzol it might continue in the urine for three weeks: in one case[1] it was found 15 months after the patient had received ten injections of salvarsan. In acute cases of poisoning it was exceptional to find arsenic in the urine for longer than a week or ten days after the administration of the poison. In cases of prolonged administration arsenic, having a strong affinity for the keratin tissues, was found in nails, skin, and hair, especially in the proximal portions which had grown since the arsenic had been given. Distal portions of the hair which had been in contact with sweat or blood-stained fluid might absorb arsenic therefrom; this had occurred in the Armstrong case. Arsenic might be found in the sweat, saliva, bronchial secretion, and even in the milk, as well as in urine and fæces. However, in two cases where salvarsan was given to patients during lactation Sir William Willcox had been unable to find arsenic in samples of milk taken from 5½ to 72 hours after the administration, so that any benefit to the child resulting from the administration of arsenic to the mother could not be due to the presence of arsenic in the milk.

[1] THE LANCET, April 22nd, 1922.

Distribution of Arsenic in the Body in Fatal Cases.

The distribution of arsenic along the intestinal tract in fatal cases was important, as it gave information as to the probable time of the administration. Usually the liver contained a considerable quantity of the drug. In acute salvarsan poisoning there was marked fatty degeneration of the liver and kidneys, and usually the heart muscle would be damaged. In using salvarsan, the risks from its toxic powers should always be present to the mind; this danger, Sir William Willcox thought, was usually treated too lightly; yet the number of venereal clinics now established made it a very important matter. Liver and kidney changes might occur weeks, or even months, after the use of the arsenic compound. It had been pointed out that much of this danger could be avoided by giving the patient glucose shortly before using the anti-syphilitic injection; the truth of this had been confirmed, and it was a course which should be universally followed.

The lecturer concluded by passing onto the screen records of the clinical and pathological findings in recent notorious poison cases, using the occasion to emphasise the lessons which recent research had taught. He also showed specimens of weed-killer, syringes, and other interesting exhibits in connexion with criminal cases.

Discussion.

The PRESIDENT, in conveying the Society's thanks to Sir William Willcox, expressed the view that the paper would prove historic, by reason of its thoroughness and clearness. He alluded to the importance of the fact that the symptoms following a poisonous dose or doses of arsenic closely simulated those of natural disease. He spoke in appreciative terms of the value of Sir William Willcox's work in furthering the administration of justice. The latter had referred to the importance of regulating the sale of arsenic, and possibly it would be wise to impose further restrictions, though it appeared doubtful whether these would be of any practical use.

Dr. F. S. TOOGOOD asked whether the disposition of arsenic in the body after that body had lain a year or so was the same as that immediately following death.

Dr. BERNARD SPILSBURY referred to the danger of arsenical poisoning as a result of leakage from chemical laboratories; many students of science at the present day had access to these poisons, and to bacteriological poisons; hence these laboratories formed a serious phase in this problem. He was convinced that the injection of the organic arsenic compounds in the treatment of syphilis was a danger of considerable importance. A large number of patients who commenced treatment at venereal clinics ceased before the course was complete, and the cause of this discontinuance was probably largely due to the injurious effects they had experienced from the injections. There had been a number of deaths of persons in whose stomach arsenic was found, but there was difficulty in ascertaining their history because of the conditions of secrecy attending the treatment of the syphilis. This was an aspect of the subject which the Ministry of Health ought to take steps to meet.

Earl RUSSELL thought Sir William Willcox's warning in regard to the possible dangers of treatment by salvarsan was much needed.

Sir WILLIAM WILLCOX, in reply to Dr. Toogood, said there were cases in which one could draw no conclusion from the way the arsenic was distributed in the body, especially where putrefaction had occurred and the tissues were liquefied. The value of the opinion formed depended on the condition of the body at the time the examination was made, and the probable condition of the body since death. In the Armstrong case Dr. Spilsbury was satisfied that the arsenic found in the cæcum had been there during life; but there were in some cases conditions of putrefaction in which such a deduction would not be justified. Each case must be judged individually. The fact that traces of arsenic were detectable many weeks after receiving the last dose of salvarsan added an element of considerable difficulty to toxicological cases of arsenical poisoning; and this factor would have to be very carefully considered by those who happened to be investigating a particular case. It was not possible to distinguish during analysis whether the poison was inorganic arsenic or arsenobenzol derivative.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.

THE annual general meeting of this Society was held at 11, Chandos-street, on June 22nd, with Sir PERCY BASSETT-SMITH in the chair.

Trypanosomes in the Human Brain.

Dr. A. C. STEVENSON gave a demonstration of microscopical sections of human brain showing marked small-celled infiltration round the blood-vessels, and the presence of trypanosomes in the white and grey matter of the frontal lobe, in the pons Varolii and upper part of the medulla oblongata of a case of chronic sleeping sickness. Although trypanosomes had previously been demonstrated within the lumen of cerebral capillaries in cases of sleeping sickness, Dr. Stevenson believed that his specimens are the first to show the parasites lying between the nerve cells free in human brain tissue.

Anopheles and Malaria Control in Trinidad.

A paper by Dr. ERIC DE VERTEUIL on Anopheles and Malaria Control in the Brighton-La Brea Rural Sanitary District, Trinidad, was read in abstract by Dr. ANDREW BALFOUR. A number of lantern slides were also shown. The particular area of Trinidad where Dr. de Verteuil had been engaged at work since 1919, as medical officer to the Trinidad Lake Asphalt and Petroleum Companies, has a pitch lake of 80 acres, and extensive oil-fields in the neighbouring forest.

Malaria has for long been prevalent despite efforts by the company during the past decade to control the spread of infection by screening the bungalows, by attention to drainage, and by clearing of grass on the estates. An unprecedented invasion by the anopheles at Brighton-La Brea, in August, 1920, led to the adoption of vigorous anti-malarial measures. The grass was cleared away by mowing machine and cutlass for a radius of 200 yards from all bungalows and buildings, and all drains within that area were brushed, cleaned, and graded. Other breeding-places were filled in or drained or treated with crude oil. The cleared drains were then burnt out with an oil mixture, fed by a hand-pump spray; this had the effect of suppressing the growth of grass for three months or more. Within a few weeks anopheles was reduced to very small numbers, but the effect was only temporary; in 1921 the use of Trinidad liquid asphalt and sanitary oil for the treatment of the drains was introduced. A mixture of liquid asphalt and sand, allowed to flow ignited along the course of the open drains, and the spraying of sanitary oil on the blazing asphalt effectively destroyed all growth in and on the sides of the channels. When cool there remained a firm smooth lining of asphalt and sand which provided a durable and impervious surface, capable of resisting the scouring of the water and preventing growth of vegetation in the drain for a long period. Where the gradient was too steep for the asphalt to remain set, the heat generated was sufficient to bake the clay to a state of resistant hardness which served much the same purpose as the asphalt lining. The cost of lining surface-drains in this manner was estimated at between 14 and 20 cents only per square yard, as compared with one dollar per square yard of concreting. The result had been the extermination of mosquitoes from the district and a great reduction in the cost of upkeep of the drains. The drain so treated must be dry at the time; if the flow of water was continuous throughout the

year its course needed to be temporarily diverted during the process of asphalt lining. The pitch lake itself, owing to constant changes in its surface and resulting unevenness, provided extensive holes for the accumulation of water and consequent permanent breeding-places for anopheles, which called for special methods of drainage by pumping. The larval-eating fish, met with in the pools on the lake surface assisted to destroy mosquito larvæ. Charts showing the malaria rates per 1000 among the native workers, and the results of the spleen census of the children suggest a decline for the short period during which preventive measures had been employed.

Dr. E. P. MINETT spoke in praise of Dr. de Verteuil's ingenuity. The methods used would prove of great service in British Guiana. The cost, despite freightage of the asphalt from Trinidad, was considerably less than that of concreting drains.

Sewage Disposal in the Tropics.

Dr. MINETT gave an account of a cheap type of school latrine for use in country districts in the tropics, particularly in relation to ankylostomiasis and other intestinal diseases. The latrine described was on the septic-tank principle, and was capable of effectively disposing of sewage matter containing typhoid, dysentery, and other organisms. Dr. M. Khalil, however, had discovered living hookworm ova in the effluent. It was proposed to meet that difficulty by employing a sump for the daily collection and subsequent disinfection of the effluent before final disposal. In the construction of the latrine a series of concrete drain-pipes, made in the colony, were used, consisting of two inner tubes, side by side, 1 ft. in diameter and 4 ft. in length, within an outer tube also 4 ft. in length, but 4 ft. in diameter and set in a concrete bed. The inner tubes, resting in a circular groove, and, at the top, fitting just below the opening in the seat, were removable and were provided with two slots at the base to allow the passage of the liquid sewage to the larger outer tube which formed the septic tank. Both tubes were closed in by a hard crab-wood cover perforated for the seat and lid over each of the inner tubes. The children were made responsible for the cleanliness and daily flushing out of the latrines by pouring water down each of the inner tubes, and thence by the slot at the base to reach the outer tube or septic tank, the outlet of which led into the soil-pipe connected with the main channel to the sea. The rainwater from the roof was conducted into the urinal waste-pipe, and so assisted, in time of rainfall, in flushing the common soil-pipe. Crude petroleum was applied at monthly intervals.

The House Incidence of Sprue.

Dr. ARTHUR POWELL gave an account of 36 cases of sprue, which had come under his observation in India, and which were capable of grouping into nine sets according to their house or family incidence. The peculiar distribution of this disease had led many to suspect its infective nature. That no contact cases had arisen in England from the many patients returned from the tropics, might, he thought, be due to the adverse influence of the home climate on the microbic agent, if such there were, when separated from its host. A group of 16 cases was distributed among members occupying bedrooms in a club in Bombay, but Dr. Powell avoided drawing conclusions as to evidence in favour of sprue being an infective disease. In referring to the sanitary condition of three houses in which cases had occurred, he mentioned that the houses were very old with much decaying wood in each; there were no water-closets, the excreta being removed daily from commodes.

Sir PERCY BASSETT-SMITH regarded the infectivity of sprue as not proven, pending further information as to the endemicity of the disease and as to the conditions of living of cases occurring in other houses.

Dr. P. H. MANSON-BAHR had been much impressed by his experience in Ceylon, ten years ago, of the distribution of cases of sprue in families, among partners in business, and friends sharing the same bungalow; also by its occurrence in husband and wife, mother and daughter, a planter and his housekeeper, and in as many as five in one family. He referred to the association of dry-rot and sprue. The nasal catarrh, progressive anæmia, and lassitude in sprue might be attributable to the nature of the dry-rot with its fine powdery dust, which, by gaining access to the nostrils, produced a strong musty fæcal odour. The disease was common among those living in bungalows, the structure of which was particularly liable to dry-rot. Sprue bore no relation to altitude.

Prof. WARRINGTON YORKE did not consider that Dr. Powell's facts could be taken as proving the infectivity of sprue.

Dr. G. C. LOW deplored dogmatism on the subject at this stage. He compared the house incidence of sprue with the so-called blackwater-fever houses in West Africa, where the incidence depended on the endemicity of the disease affecting a particular area rather than the house. There was no evidence of infection being conveyed at home.

Colonel H. J. BARRATT referred to the possible conveyance of infection through food-, water-, or milk-supplies. The fact of the possibility of spread of enteric fever and dysentery through the agency of the native "sweeper" who used the same cloth for wiping commodes, toilet-glass, breakfast plates, &c., suggested a similar means of distributing sprue infection.

Dr. MINETT alluded to *Streptococcus fæcalis* as a likely associated bacteriological factor. In British Guiana there was plenty of dry-rot but no sprue.

Dr. POWELL said he had drawn no conclusions, but merely recorded cases. It was striking that, in the incidence of sprue in the Bombay police-force, whereas six out of ten police officers suffered from the disease, none of the 70 N.C.O.'s of the force were attacked. Sprue was not confined to Europeans, but occurred also among the natives.

INFANT WELFARE CONFERENCE.

THE conference arranged by the National Association for the Prevention of Infant Mortality, held at Carnegie House, Piccadilly, London, W., from July 3rd to 5th, discussed at the afternoon session of the second day the subject

How Far should Treatment be Undertaken at an Infant Welfare Centre?

Opposing points of view were brought forward by the openers of the debate, Dr. G. F. BUCHAN (Willesden) and Mr. E. B. TURNER (London).

Dr. Buchan contended that the object of welfare centres was the maintenance of the health of children up to five years of age, this being done by regular attendance at the centres, regular weighing and examination of the infants, and by educating mothers in the rearing of their children. When a child was found to be well, the doctor told the mother to "carry on," and gave her general advice as to feeding, clothing, exercise in the fresh air, regular habits, and so forth. But if the child was found to be not quite well, what was to be done? It was agreed that minor ailments requiring very simple treatment might be dealt with at the centre. But minor ailments were of varying character. For example, diarrhœa might be produced simply by errors in diet, and be cured by regulating the diet; but there existed conditions of diarrhœa calling for a drug, and in those cases, should it be given? A minor ailment was apt to become a major one; and the question arose at what point in the case the welfare doctor was to say: "I can no longer give treatment, and the child must be taken elsewhere." The centre had undertaken a certain responsibility to keep the child well and to strengthen it against disease. When disease appeared, was the centre not to be allowed to repel the invader? The attack against disease

meant equipment, and centres could not be equipped to contend with all forms of disease, but in Dr. Buchan's opinion they should be linked up with the hospital and with a system of domiciliary visiting and of out-patient treatment, if they were not to become useless institutions.

Preventive and Curative Medicine at the Centres.

It was hard to draw the line where preventive medicine ended and curative medicine began. Treatment of diarrhœa was curative, but also preventive, because it prevented a more serious form of diarrhœa with perhaps a fatal issue. Again, the object of the treatment of a child with enlarged tonsils and adenoids was not only to relieve the condition, but to prevent more serious complications, such as otitis media or cerebral abscess. An expectant mother might come to an antenatal clinic suffering from an excessive non-venereal vaginal discharge. To cure her of that condition would greatly increase her comfort and well-being; it would also minimise the chance of infection at the confinement, the risk of puerperal sepsis, and of damage to the infant's eyes. An objection was made that, if treatment was given at a centre, the general practitioner lost valuable experience and work which he could use to the well-being of the general population. But it must be remembered that, by refusing treatment, work was taken out of the hands of medical officers of the 1620 welfare centres—work by which the public health might be established. The centres were organised in the interests of the children and of public health; and medical men were required to run them who would regard disease as a deviation from health, who would consider what steps could be taken to restore health immediately, and to prevent deviation from again occurring. Officers of welfare centres should be expert in detecting the earliest stages and symptoms of disease. All centres should be linked up with domiciliary treatment; the medical officer of the centre should have general supervision and charge of the child and there should be at hand an expert personnel to give advice as required.

Position of the Family Doctor.

Mr. Turner put forward the considered policy set forth by the B.M.A. in 1920, in a report drawn up as the result of an exhaustive inquiry held by persons connected with the welfare centres. All medical men in the kingdom were anxious that centres should be carried on and should continue their good work in helping to reduce infantile mortality. These centres should be staffed by family doctors, men who understood the people and knew all about them, and who had a large experience in treating children. A child was not a little crucible into which certain things could be put and known results produced, but a human being to be treated individually. During the war general practitioners were taken from their work, and many centres were staffed by newly-qualified men and women instead of by practitioners of many years' standing. The plan advocated by the B.M.A. was that centres should be staffed by a rota of general practitioners, appointments being held long enough to prevent sudden changes, while those appointed must have knowledge of, and interest in, the work, and must be prepared to carry it out conscientiously, irrespective of other claims on their time. If the centres were to be successful, the medical profession must be in their favour; if the doctors were hostile, the centres would not flourish as they ought. In some cases doctors had been alienated because promoters of centres had done their best to establish out-patient departments where treatment should be given, to which mothers should be urged to take their children when sick, encouraged to attend by gifts of free milk.

Practitioners of the future would, he said, be better equipped, because the curriculum of the General Medical Council had been in the melting-pot, and the new requirements included the necessity for every student to take a course at a child welfare clinic. Mr. Turner agreed with Dr. Buchan that it was difficult to draw a line between educational and medical advice, but it should be taken as an axiom that nothing should be treated which, in the absence of a centre, would be recognised as a case requiring a doctor. If a child was ill, or showed symptoms suggesting that he was likely to be ill, inquiries should be made whether there was a family doctor, and if not, the child should be sent to a hospital or clinic but not treated at the centre itself. Mr. Turner wanted to retain as far as possible the individual element; the children should be treated by the doctor who knew them and their homes and their parents at first hand, and the mothers should be educated to avoid and overcome the causes of infant mortality by extending an enlightened opinion among them. Ill children should not be mixed up with healthy ones. The great majority of the medical profession thought that the centres should be educational, preventive, and advisory.

Discussion.

Dr. C. L. WILLIAMS (Todmorden), though agreeing with Mr. Turner that the first line of defence and offence in the battle between microbe and man was the private practitioner, took exception to the insistence on the necessity of keeping his goodwill, as savouring of blackmail and coercion.

Dr. R. H. H. JOLLY (Wolverhampton) said that many general practitioners looked to health visitors to carry on minor treatment for them. It was not always feasible to have the centre linked up with the hospital, which might be a very long way from the mothers' homes. The system of collecting letters for hospital treatment also proved a difficulty.

Dr. R. WOOLSEY STOCKS (West Bromwich) said there would be nothing to take exception to in the staffing of centres by family physicians if they always came up to the standard set by Mr. Turner. In practice there were drawbacks. The general practitioner was often irregular in his attendance at the centre, and it was impossible to avoid this. Again, he was apt to skirk responsibility in regard to the internal economy of the centre, and leave it to the health visitor. It had sometimes happened that advice given by the general practitioner had clashed with that of the health visitor, and that of the health visitor had been the more modern view. Dr. Stocks considered that only the earliest treatment should be given at centres unless there was no other provision; in that case, treatment should be given at a clinic held separately and at a different time, even if it had to be in the same building.

Dr. T. S. MCINTOSH (Hendon) thought that any treatment of which a child was in need should be given, so far as it could be given efficiently, at a centre. He believed that there were children now going without treatment, while the centre doctors were willing and able to give it and there was nobody else available to do so. He did not think the public would ever consider it sensible that a mother should be encouraged to bring her child regularly as long as it was well, and that as soon as it was *not* well she should be sent away.

Dr. D. BREWER (Swindon) agreed in principle that general practitioners should carry on the centre work, but found that the most efficient of them, while they were interested in the work and would like to do it, had to refuse on the score of insufficient time.

Dr. BARBARA SUTHERLAND (Glasgow) said that practically none of the poor mothers in Glasgow had a family doctor, though often the fathers had a panel doctor. By sending children to hospital they did not get the advantage suggested of having a doctor who went into the homes; the hospital doctor knew no more about the home and family conditions than the centre doctor.

Dr. A. H. HART (Southall) thought it would be well if, in addition to proprietary medicines and milk, centres kept a case of British Pharmacopœia drugs to be administered by a dispenser.

Dr. A. G. NEWELL (Tottenham) asked whether, if a child developed enteritis, it was proposed that the centre doctor should say, "I am unable to prevent you from dying." If one could ensure the child's getting to a doctor it would be all very well, but, if mothers knew they must not take an ill child to the clinic, they were apt to go to a chemist and get wrong treatment prescribed.

Dr. H. SHORE (Walsall) considered treatment should be given as far as possible. Parents often called in a doctor at the last moment to sign the death certificate and avoid an inquest; in many cases they could not afford the fees charged. He had found chemists charging 3s. 6d. for a bottle of medicine in slum districts.

Mrs. KITSON CLARK (Leeds) spoke as representing voluntary workers, whom she described as buffers between the centres and medical practitioners. She did not approve of the rota system, which was likely to interfere with the continuity of the work. It was impossible for a busy doctor in a slum area to go and make friends and get to know the family affairs of his patients. She favoured the young, up-to-date, whole-time official rather than the general practitioner for centre work.

Mr. H. GILFORD (Reading) thought centres should be confined to healthy children; otherwise mothers would come for treatment and not for advice, and centres would be swamped by ill children. He objected to the rota system, but did not see why centre doctors should be women rather than men; the important thing was to get a medical officer who was keen, had studied that branch of work and was capable of dealing with it.

Dr. MABEL BRODIE (Durham) referred to county centres which, she said, presented a different problem from those in large or moderate-sized towns. In the county of Durham only minor treatment was given at centres, but they ached to give more, and in many cases general practitioners would be thankful to have the babies taken off their hands. Health visitors made inquiries in the homes and were present at the centres to give information as to family circumstances. They had neither doctors, time, nor money for supplying special treatment clinics apart from the centres. There was no hospital in mining villages, and mothers could not afford railway fares to take their children to the towns.

Dr. THOMSON (Deptford) said that welfare centres had come to stay, and with whole-time officers. He did not believe in the rota system, and the general practitioner was the people's servant, and required no special consideration.

Dr. S. G. MOORE (Huddersfield) recommended that the Ministry of Health should lay down a principle stating the function of the centres. Their work should be preventive and not curative.

Dr. STELLA CHURCHILL (Bermondsey) thought whole-time officers were best for centre work. She had found that many mothers, especially in times of unemployment, went to the parish doctor, and babies were frequently taken into Poor-law infirmaries against the mother's wish. If they had to go to hospital, it often meant long waiting and travelling under unsuitable conditions.

Dr. H. SCURFIELD (Folkstone) thought the point had been well brought out that the centre doctor knew more about the babies than the doctor called in occasionally. The chief difficulty was to find a link between the centre and some form of domiciliary treatment, so that the child should be sure of every care from birth to the time it left school.

Dr. BUCHAN and Mr. TURNER briefly replied, the latter warmly repudiating a suggestion that doctors' views had been coloured by self-interest. The welfare of the patient was always the first consideration. Mr. Turner declared that no body of men and women were more willing to give their services where they were needed, regardless of the question of fees, than members of the medical profession.

Reviews and Notices of Books.

NERVE EXHAUSTION.

By Sir MAURICE CRAIG, K.B.E., M.D., F.R.C.P., Physician for and Lecturer in Psychological Medicine, Guy's Hospital, &c. London: J. and A. Churchill. 1922. Pp. 148. 6s.

WE have already made incidental allusion editorially to Sir Maurice Craig's book entitled "Nerve Exhaustion," but the importance of the subject and the prominent position enjoyed in the profession by the author are sufficient reason for a more detailed notice.

The conception of neurasthenia, like that of hysteria, has always suffered from nosological difficulties, and, before the advent of the Freudian era, had already begun to disintegrate; a more select and rigorous analysis of symptoms had justified the clinician in separating it from exhaustion psychosis, constitutional psychopathic inferiority, the manic-depressive state, hysteria, and other conditions characterised by psychical or by both psychical and somatic symptoms. The endocrinologist had been at work too, as well as the internist, and the whittling-away process was further increased by Freud's limitation of the conception to the results of sexual excess. Of the frequency of "nerve exhaustion" as a nervous symptom, however, there has never been, nor can there be, any question, and now Sir Maurice Craig has entered the lists as the champion of its nosological reality, widespread occurrence, pleomorphic nature, and withal, its curability.

We find, nevertheless, on perusal of this readable account of the state, no attempt at precise delimitation; on the contrary, the entity, at the best always rather unwieldy, is enormously over-burdened by the author's inclusion, as authentic symptoms of "nerve exhaustion," of every imaginable "nervous" sign, from the doubtless acceptable insomnia, irritability, headache, and so on, through the gamut of hallucinations, tics, kleptomania, homicidal phobias, agnosia, apraxia, fugues, amenorrhœa, and what not, to the culmination of the symptomatological A to Z in the writing of libellous letters and postcards. A conception as broad as this must inevitably result in many shallows. The inquirer may also be confused by the inclusion of insomnia, emotion, menorrhagia and metrorrhagia, neuroglandular disorder—to mention but one or two—both as causes and as symptoms. In this connexion so prominent is the attention paid to fatigue, naturally enough, that the definition given at the outset is: "Nerve exhaustion is a state in which there is undue physical, nervous, or mental fatigue"; the reader will add that apparently one of its chief causes is fatigue, for we are told that "anything which fatigues the nervous system may cause exhaustion," and one of its chief symptoms is—fatigue.

Sir Maurice Craig has committed himself to a number of statements which are open to misconstruction and not a little to doubt; thus, "the central nervous system of a tall person is frequently less well nourished than that of an individual of shorter stature, and this may give rise to nervous instability." Again, "an alteration of sensibility which is either physical or psychical in origin may in time lead to changes in function"; or "functional tremor, for example, of the hands, can be readily tested by asking the patient to protrude the tongue, when, if functional, the tremor will cease." These and others which might be cited make us feel that interest in the important generalities of his subject has led the author into a lack of precision in details.

Such criticisms apart, however, the reader will find compensation for any scientific dissatisfaction which he may feel in perusing the highly useful and practical chapter on treatment. Theories and definitions and discussions can be left on one side when he turns for advice to the experience of the author in

therapeutics. Nerve exhaustion, be it disease, cause, symptom, sign, is, at any rate, a common "complaint," and its successful treatment pleases physician and patient alike.

MERCHANT SEAMEN.

Their Diseases and their Welfare Needs. By W. E. HOME, O.B.E., B.Sc., M.D., Fleet Surgeon, Royal Navy. London: John Murray. Pp. 111. 5*s*.

THIS country depends for its life on our Mercantile Marine—the experiences of recent years prove that, but those who man the service have never received the recognition at the public hands which would be implied by close and continuous interest in their welfare. Fleet-Surgeon Home's description of how the merchant seaman works, eats, and sleeps is lively, sympathetic, and valuable; he makes it clear that many intolerable abuses and hardships have been reformed away, and that good employers are giving evidence of willingness to do much for the sanitary salvation of their servants, but he does not disguise the rigours of the life, and is able to point over and over again to directions where much more could be done. The reports on the accommodation for seamen in ships of to-day appeared in our own columns, when the information supplied aroused much interest outside medical circles. These reports showed for the most part the efforts that have been made by enlightened firms to better the conditions of their seamen, but the general impression drawn—and intended, we believe, to be drawn—from Fleet-Surgeon Home's little book is that British seamen, despite the rigours of their work and its value to the community, do not obtain treatment comparable to that received by other British workmen. This at least ought to be set right, and "Merchant Seamen" supplies the medical arguments for reform.

A TEXT-BOOK OF BACTERIOLOGY.

Fifth edition. By HANS ZINSSER, M.D., and FREDERICK F. RUSSELL, M.D. London and New York: D. Appleton and Co. 1922. Pp. 1194. 35*s*.

IN the fifth edition of this book, which has a considerable popularity with American students, the authors adhere to the stereotyped plan of producing a multum in parvo, designed to appeal both to the student commencing his course and to the more advanced laboratory worker. The continued extension of the subject of bacteriology must soon lead to the omission of much technical information upon methods and stains in any book which aims at being more than an examination manual for students, but perhaps that time is not yet. The authors have here spread their net widely, and included information on almost all of the subjects touched by the study of pathogenic bacteria and protozoa; and the result is a good, if rather crowded, example of the modern text-book on this subject, brought up to date by a well-balanced account of most of the recent work. Though we may consider that the omission of a dissertation on thermo-regulators, and on the preparation of culture media, might have saved valuable space without detracting from the merits of the book, we find ourselves in whole-hearted agreement with the authors in the inclusion of clinical facts and immunological data; without which such an essentially practical subject as bacteriology becomes, to the student, uninteresting and barren. There are a few ambiguities and errors to which attention may be called. The organism of relapsing fever appears to be included under the genus treponema on p. 848, and under the spironema on p. 849; whilst the organism described by Noguchi, in yellow fever, is referred to as the *Leptospira icterohæmorrhagica*, in error for *Leptospira icteroides*, on p. 881. The description of the sugar reactions of the typhoid-colon group is not very clear. A more forcible presentation of Koch's postulates, which, by the way, do not figure in the index, would be welcome at a time when ill-considered bacteriological research gains such easy entry into print.

This is a thoroughly good text-book, well produced and well illustrated.

INTESTINAL OBSTRUCTION.

Les Occlusions Aiguës et Subaiguës de l'Intestin. Par A. C. GUILLAUME. Paris: Masson et Cie. With 21 figures. Pp. 304. Fr.12.

WE have read this book with great interest and considerable profit. It is refreshing and unusual to find a surgeon in active practice making time to undertake experimental work to confirm or disprove theories which have a vital bearing on his work, and Mr. Guillaume has combined pathological, clinical, and experimental data in a skilful manner. He deals with general principles rather than particular details, though many individual cases are aptly quoted. No one is likely to forget that intestinal obstruction may simulate poisoning after reading the author's account of the eminent lady, a political enemy of Napoleon, who was seized with abdominal pain, vomiting, and collapse after partaking of a meal. A political crime was suspected, but "heureusement pour Napoléon que l'expulsion, par anus, d'un calcul biliare important, vint mettre un terme aux accidents."

The author appears to prove his theory that most of the later serious symptoms in intestinal obstruction are caused by absorption of poisons from the intestine, and the corollary naturally follows that many cases which otherwise would die could be saved by emptying the distended gut at the time of the operation. It is an undoubted fact that many patients die even though their gut obstruction be relieved and no peritonitis exist. The chapter on the "physiopathologie" of obstruction throws great light on these cases. Mr. Guillaume shows wide knowledge of the literature, though there are some omissions. D. C. L. Fitzwilliam's paper on intussusception (THE LANCET, 1908, i., 628 and 709) has apparently escaped his notice. The weakest part of the book is the section on treatment, which, though sound enough, is meagre. Few details are given as to the exact technique required for the various manipulations described, and this lack of detail seriously detracts from the general practical value of the monograph. Moreover, rather too large a space (40 pages out of 300) is allotted to statistics. The illustrations are poor, though they carry their meaning well enough.

The book is a stimulating contribution to the study of intestinal obstruction.

DIETETICS.

Food Values: What They Are, and How to Calculate Them. Second edition. By MARGARET MCKILLOP, M.A., M.B.E., Fellow of King's College for Women, University of London. London: George Routledge and Sons, Ltd.; New York: E. P. Dutton and Co. 1922. Pp. 171. 3*s*. 6*d*.

THIS little book is written in a popular style and is full of excellent common sense. It is intended chiefly for the use of students of diet, who while wishing to study the subject quite seriously, are hampered by the lack of fundamental scientific knowledge such as the larger text-books would expect their readers to possess. The book is written so clearly and simply that it should be much appreciated by the ever-increasing number of people who take an interest in the scientific aspects of feeding. Those responsible for the food of large numbers of persons in hostels, workhouses, or prisons, for instance, would make themselves more efficient and more immune to criticism if they were to combine with their administrative knowledge some of the scientific principles of dietetics. The culinary demands of invalids make such study even more essential to those superintending the housekeeping in private nursing homes, where the food provided is so frequently a source of complaint. Even busy practitioners would profit by reading such a book as this; it would help them to answer the curious intelligent patient who talks in calories, and expects his adviser to guide him in understanding his diet. As the book is written by a woman skilled in the art of cookery it really is a practical guide to the calculation of the calorie value of real food, as consumed; abridged

methods of calculation, which are quite adequate for the purpose, are preferred to more complex methods used for scientific research on nutrition. Vitamins are discussed, and so are protein requirements, but the author's sane view is that, in normal and well-chosen diets, if we look after the calories, these will take care of themselves.

Nutrition and Clinical Dietetics. Second edition. By HERBERT S. CARTER, M.A., M.D., Assistant Professor of Medicine, Columbia University; PAUL E. HOWE, M.A., Ph.D., Associate in Animal Pathology, Rockefeller Institute for Medical Research; and HOWARD H. MASON, A.B., M.D., Instructor in Diseases of Children, Columbia University, New York. New York: Lea and Febiger. 1921. Pp. 730. $7.50.

THIS is an exhaustive and well-written book of all-round merit, and based on the latest scientific data, in so far as these can be applied to the problem of diet in pathological conditions. One of the difficulties in the way of its use by English readers is the employment of American names for articles of food. Such names as chuck, cold slaw, lady fingers, apple snow, cornmeal mush, waffles, or wheaten grit, could hardly be prescribed to untravelled English patients without a certain amount of explanation. This is always one of the chief obstacles to the use of works on dietetics in countries other than those for which they are originally written. No doubt these obstacles could be surmounted, but as we have excellent text-books on the subject written expressly to suit our own language and cookery, there is no good reason why much effort should be applied to overcome them. As regards the general principles of the work, there can be nothing but praise; readers who know enough to apply these would certainly profit from reading the book, because so much of the best work on nutrition has been done in the United States, and it is all well summarised here. Considerable stress is laid on the mineral requirements, and on the feeding of infants and children.

JOURNALS.

BRITISH JOURNAL OF CHILDREN'S DISEASES. Vol. XIX. April–June. Edited by J. D. ROLLESTON, M.D.—Drs. F. J. Poynton, Hugh Thursfield, and Donald Paterson contribute the first part of an article on the Severe Blood Diseases of Childhood: A Series of Observations from the Hospital for Sick Children Great Ormond-street, based on the study of cases met with during the last two and a half years. The following classification is adopted: (*a*) Congenital anæmias, including acholuric jaundice and polycythæmia; (*b*) severe anæmias, including anæmia gravis and von Jaksch's anæmia; (*c*) leukæmia; (*d*) simple anæmia; (*e*) lymphadenoma; (*f*) purpura. This first part of the article is devoted to consideration of congenital anæmia and severe anæmias.—In a Note on the Question of the Causation of Postural or Orthostatic Albuminuria, Dr. F. Parkes Weber states that lordosis cannot be the only factor in the production of the condition, even in cases in which ureteric catheterisation proves the albumin in the urine to come from only the left kidney. Individual predisposition of some kind is essential. The albuminuria is often most marked in the morning, even though the orthostatic condition is maintained at other times of the day. Moreover, lordosis does not always produce albuminuria, just as chronic passive congestion of the kidneys in heart disease is not invariably associated with albuminuria. Dr. Parkes Weber is of opinion that in uncomplicated cases of orthostatic albuminuria the life may be regarded as a normal one from the assurance aspect.—Dr. Robert Hutchison reports a Case of Aneurysm of the Ductus Arteriosus. The patient was a girl, aged 6 years, in whom death was due to profuse hæmoptysis, which the autopsy showed was due to rupture of an aneurysmal dilatation of a persistent ductus arteriosus into the left lung. Closure of the pulmonary end of the ductus arteriosus accounted for the absence of the characteristic murmur, the only cardiac signs during life being a diffuse apex beat and a soft systolic murmur at the apex and over the sternum.—Dr. E. H. Kelly records a case of Purpura Fulminans following Measles. The patient was a male infant aged 17 months, admitted to hospital with measles and broncho-pneumonia. 30 c.cm. of anti-streptococcic serum were injected on admission and considerable improvement took place, but 17 days after admission, and five days after the serum rash, petechiæ appeared on the trunk and limbs and a symmetrical purpuric area shaped like a butterfly's wings developed on the cheeks and nose. Death took place 17 hours after the first appearance of the purpura. There was no autopsy. Although the purpura occurred shortly after the serum rash, it was not probable that serum was responsible for the condition in view of the fact that cases of purpura fulminans were described before the introduction of horse serum into therapeutics and a large proportion of cases have followed scarlet fever in which no serum was used.—The abstracts from current literature are devoted to acute infectious diseases.

ARCHIVIO DI SCIENZE BIOLOGICHE (A. Tocco, Naples).—The last volume of this Italian periodical to reach us is as varied in contents as its predecessor, and Dr. Quagliariello, the editor, is to be congratulated on bringing together into one number such interesting and varied contents. From the physiological laboratory of the University of Turin comes a systematic study, written by Dr. T. Gayda, of the electro-motor phenomena manifested during the ontogenetic development of the common toad. From the institute of physiology of the University of Pisa we have the records of a careful research, made by Dr. G. Buglia and Dr. G. Barbieri, into the toxic effects of injection of eel-serum. From the institute of pharmacology and therapeutics of the University of Naples we have an interesting paper by Dr. A. Chistoni, on the action of quinine upon the uterus of mammifers, and another on the spectrum of absorption of methæmoglobin, by the Editor. Prof. Fil. Bottazzi, who is responsible for the excellence of the publication, contributes a résumé of the problems presented by human alimentation.

AMERICAN JOURNAL OF HYGIENE.—The May number is mainly occupied by an elaborate paper on the Resistance of Different Hosts to Experimental Trypanosome Infections, with special reference to a New Method of Measuring this Resistance, by W. H. and L. G. Taliaferro. Their work is based on a study of 13 experimental trypanosome infections with *T. lewisi* and *T. equiperdum* in the rat; *T. brucei* in the dog, mouse, and guinea-pig; and *T. rhodesiense* in the rat, mouse, dog, and guinea-pig. Determinations of the number of trypanosomes per c.mm. of blood were made on 125 days, and drawings, measurements, and computations of statistical constants made for 114 sets of 100 trypanosomes each. The resistance elaborated may either retard the rate of reproduction of the parasites or may destroy them after they are formed. The validity of the coefficient of variation for total length can be taken as a measure of the rate of reproduction of trypanosomes. In the case of the non-pathogenic *T. lewisi* infections in the rat, the resistance elaborated retards the rate of reproduction of the parasites and makes for their actual destruction after they are formed. In the continuous type of infection, *T. rhodesiense*, *brucei*, and *equiperdum*, there is no evidence that any resistance is built up; on the other hand, should these infections relapse, as *T. equinum* in the rat, *T. rhodesiense* and *T. brucei* in the dog and guinea-pig, the host elaborates a resistance which destroys the parasites. The remaining pages contain four short papers of interest. Reynold A. Spaeth writes on physical exhaustion and susceptibility to pneumococcus infections: Francis Metcalf Rost on the classification of American anopheles mosquitoes; Janet W. Clark, on the action of ultra-violet light on egg-albumin in relation to the iso-electric point, and C. H. Robinson adds a brief note on some observations on a case of rat-bite fever.

THE LANCET.

LONDON: SATURDAY, JULY 15, 1922.

Drug Addiction and its Treatment.

WITHIN the last year or two a number of cases of drug addiction, some of which have achieved considerable notoriety, have focused public attention on an aspect of medicine never, unfortunately, much cultivated by the profession itself. There are by-paths of medical lore along which the student will never proceed or, at least, is not likely to proceed, if he is not given a lead by his teachers, and it is in these lanes that the irregular practitioner flourishes. Instances of the truth of this general statement will at once occur to the mind, but we are concerned for the moment with the treatment of drug intoxications, forced into the limelight of publicity largely through the passing of the Dangerous Drugs Act of 1920.

From the obiter dicta of anonymous magistrates published in the daily press it might be supposed by the uninitiated that drug addiction is an offence or a misdemeanour and not a disease, though a description of symptoms and of treatment will be found in every adequate text-book of medicine; even if recognition of this, the medical aspect of the question, has sometimes been admitted by those in authority, we have, on one occasion at least, been assured that imprisonment is salutary because of the inability of the victim to obtain his particular "poison," and the incarceration has been hailed as a peculiarly effective form of "treatment." Such an attitude of mind is not far removed from that of the eighteenth-century judge who declared the miserable wretch before him "would be nane the waur o' a hanging," and is greatly to be deprecated. The practising physician knows that any simple and reputedly harmless drug, such as aspirin, phenacetin, sulphonal, can be taken in quantity till the limits of its compatibility with nervous health are overstepped; the individual becomes a drug-taker, and his morbid state a disease. Any anodyne or sedative may constitute the "poison," and produce a train of symptoms calling for skilful treatment. From the medical viewpoint, there is no difference whatsoever between addiction to aspirin and addiction to morphia, between alcoholism and cocainism; but because it has been thought fit to regard opium-eaters as partakers of a dangerous drug, legally, their affliction automatically becomes an offence if they are found in possession of the "poison." In chronic morphinism the loss of will-power, the dulling of the moral sense, the ethical deterioration, are symptoms of the condition no more and no less than are delirium and hallucinations those of a toxic psychosis. It is highly important to bear in mind, medically speaking, that in this respect no differentiation can be made between one drug and another, except in so far as the effects on the individual are more serious in one than in another, and this, in turn, depends, at least, as much on the patient concerned as on the drug to which he has succumbed. Otherwise expressed, we are to recognise fundamental differences in individual "make-up." By no means all, who would, can possibly become drug-takers. A dose of morphia, experimentally taken, may sicken one individual and fascinate another; it is assuredly not for want of trying that some persons are only alcoholiphil, but never alcoholic. To explain the action of drugs we must take cognisance of the soil in which they seek to germinate, prepared as it may be by neuropathic inheritance or diathesis. A tendency to suicide may assume a familial form, and so, undoubtedly, may alcoholism; and were sufficient evidence forthcoming, the association of any form of drug-taking, from tea to methylated spirit, with congenital or acquired neural instability might be demonstrated—as a fact, the student of the subject is aware that data supporting this opinion can be adduced in abundance.

We regard, therefore, with some concern the apparently tacit acceptance of the situation now arising, which can only lead to further conflicts between opposing points of view. That evils, included in which may be reckoned antisocial behaviour, are prone to follow drug addiction in certain cases, has long been a commonplace to the physician. As the law now stands, confirmed drug maniacs can scarcely hope to avoid coming in contact with it, while if its purview is extended, as seems a possible future development, then a still larger group of cases, the legitimate concern of the practitioner, will have forced on them a legal aspect to which no doctor can remain indifferent. We had begun to think that horror of the supposed stigma conferred on the mentally afflicted by sojourn in an asylum was being reduced by dissemination of the knowledge that mental disease is nervous disease and by a wider use of the expression "mental hospital"; recent public discussions, however, appear rather to nullify our hope. But what of the stigma attached to imprisonment? Are cases of nervous disease, for that is what drug cases are in essence, to be sent to prison for their "cure"? The profession is surely not so impotent, or indifferent, as to countenance further spread of this particular practice. Before drug habitués are likely to transgress the law of the land, it is the urgent duty of medical men to familiarise themselves with approved methods of treatment and with their application. Morphinism is, quâ morphinism, definitely curable; and the same may be said of many varieties of drug habit; and a nursing home or a hospital should be able to accomplish what a prison régime is now credited with. The nefarious traffic in a certain class of drug it is hoped can and will be checkmated by police regulations, and all efforts to combat this evil are welcomed by the healthy-minded citizen, who believes that prevention is better than cure. But the question whether disease can be prevented or cured by Act of Parliament requires much deeper study than it commonly receives; no study is complete which does not take into consideration the medical factors. The publicity given by recent facts to this subject will serve a useful purpose if it directs attention to a part of medical practice hitherto cultivated by comparatively few doctors, though it is one which has great possibilities of development.

Family Food Budgets: A Maintenance Ration.

DURING the two generations that preceded the war Britain was slowly becoming throughout a well-nourished nation, and from 1915–1917 the process was greatly accelerated, for a large proportion of the young male population was being fed abroad at national expense, while at home the family budget was raised to a high level by unusual wage-earning. The school-children of this period bear the marks of

a generous diet upon their teeth and bones. There was little need to choose a dietary for them or for their mothers, for there was enough and to spare, quantity making up for deficiency of quality in any of the constituent food-stuffs. This time has gone by, and as the impoverished State is temporarily making itself responsible for supplementing the starvation diet of a considerable section of the population, it is imperative to do this on economical lines. Family food budgets have been carefully studied, and the information is certainly available in part; but there is scant evidence that the knowledge we possess is being systematically utilised. Not long ago Sir ALFRED MOND expressed a doubt whether milk was precisely the best form in which to supplement the diet of expectant and nursing mothers, and a canvass of local authorities showed widely conflicting views as to whether the alternative of a mid-day meal would meet the case. Many authorities had no premises available or found it impossible to arrange meals on account of the scattered nature of the district and the absence of caterers. Others felt that mothers would be prevented by home duties or by repugnance to dining out from availing themselves of the meals. The estimates of cost sent in varied from 6*d.* a head in the case of two county boroughs using their existing school-feeding centres, to 1*s.* or even 1*s.* 6*d.* a head in the case of scattered urban districts. One county borough deemed it possible to carry on with the same money as was granted for milk, another estimated the expense as tenfold. What is reasonably practicable must lie somewhere within these limits. Mr. F. E. FREMANTLE put to the Minister of Health a question that has arisen in the minds of many. Does not the procedure whereby destitute families receive relief in money or in kind from three separate authorities—boards of guardians, education authorities, district councils—result in an uneconomic and defective dietary? And he went on to inquire whether any steps were being taken to make a better physiological use of the resources available.

The city of Glasgow has recently examined its own obligations in a critical spirit. In view of the limitation of the grant-in-aid to maternity and child welfare schemes, the town council decided to restrict the supply of milk to bottle-fed babies and to give meals only to the mothers. Dr. A. K. CHALMERS, in a report on food values to the Glasgow Corporation, analyses the caloric value and the protein-content of the mid-day meal provided by the caterer on the various days of the week. Assuming the total daily requirement of an adult woman to be 2700 calories, the single meal supplied a proportion varying from rather under one-half (1300) on Mondays to almost four-fifths (2115) on Wednesdays. Again, taking 80 g. as the normal daily requirement of protein, the amount supplied varied from 50 g. on Fridays to 61 on Mondays. Of fat, with 80 g. as the standard, 35 g. was provided on Fridays and nearly the whole quota on Wednesdays and Saturdays. The tendency to carbohydrate excess in poor households being borne in mind, the objective before the public health committee was to correct this by supplying at the dinner-table a substantial proportion of the whole daily need of protein and fat. Adding to the dinner values a morning and an evening meal consisting, as it mostly does, solely of tea with bread and margarine, on every day of the week, the total calories as well as the amount of protein and fat were found physiologically sufficient. Details of the meals are set out in Dr. CHALMERS'S report, where the lines on which they have been planned are worthy of study by other communities. Mothercraft in the choice of food-stuffs fortunately does not appear to have sunk so low in Glasgow as in many other large towns, for the report gives the expenditure on food of a family of five during a period of unemployment, in which it is seen that the sum available—namely, 19*s.* 9½*d.*—purchased a daily average of 9678 calories, of which the mother's proportion would be 2216, with 74 g. of protein and 46 g. of fat. A little help from an outside source would have made this diet sufficient in quantity and well balanced in quality. By way of illustrating the contrast in the nutritional standard of relief, Dr. CHALMERS adduces the case of a family of seven persons, two adults and five children, the youngest an infant of two weeks, with a total weekly income from unemployment relief of 35*s.*, being 18*s.* below the scale adopted by the education authority as desirable.

In a final paragraph in his report, Dr. CHALMERS puts the present difficulty in a nutshell. If agreement is to be reached by the several authorities which at present bear the responsibility for feeding, there must be some common ground of approach. One authority is charged with the relief of destitution, another with feeding children whose education is handicapped by hunger, a third with the care of necessitous mothers and young children where the need for more food is medically certified. The essential factor common to all three groups is the amount of food necessary to maintain body-weight. If the food falls short of this there is destitution when technically the mechanism of the Poor-law becomes available. The Sculcoates board of guardians has, we understand, been asked by the Kingston-on-Hull Education Committee to bear the cost of meals supplied to necessitous school-children. But, we may ask, is the community best served by distributing its responsibility in this way, with the waste and cruel uncertainty which must result? The time seems to have come for some enterprising municipality to show how to coördinate its needs even if it should involve a little stretching of departmental etiquette.

The Cardiac Child.

ONE of the most serious health problems which has still to be attacked in this country is that of heart disease in children. Great advance has been made in recent years in our knowledge of the mechanism underlying heart failure in adults and of the means whereby the muscular efficiency of the heart can be gauged. A large proportion of the cases of heart disease, however, dates from childhood, and effective measures, if they could be devised, would be more pregnant with advantage, both to the community and to the individual, if they could be applied in early life. At the provincial meeting of the Section for the Study of Disease in Children of the Royal Society of Medicine held last year, and again at a recent meeting of the School Medical Officers' Association, the subject was brought into prominence, the discussions being opened by Dr. F. J. POYNTON and Prof. F. S. LANGMEAD respectively. It was pointed out that heart disease is far commoner in children than notifiable tuberculosis, and even more productive of permanent ill-health and loss of wage-earning capacity. As Dr. JAMES KERR emphasised, heart disease has now become the largest single cause of mortality in this country, and its mortality-rate is steadily increasing. With so pressing and serious a problem to face, it were well for those into whose hands the health of the people is entrusted to review the state of our knowledge with regard to the cause of heart disease, of the methods of obviating it, and of reducing its power to cripple and

shorten life. It is a platitude to state that the chief cause of heart disease in children is the rheumatic infection and that any successful method of preventing the latter would be the most salutary measure which could be adopted in any campaign against heart disease. According to Dr. KERR, of 5000 children specially examined in the L.C.C. schools, 10 per cent. were found to be rheumatic and 1·2 per cent. to have organic heart disease, without taking into account the absentees, which, if included, would greatly swell the number.

The failure of any specific organism to obtain general recognition as the cause of rheumatism postpones exact methods for combating the infection, and we would second the plea advanced by Dr. W. P. S. BRANSON for organised research into this subject. It should not be forgotten, however, that as the result of the work, very largely of English investigators, we already know enough of the disponents to rheumatism and of the factors which influence the course of cardiac disease to justify collective action. An educational campaign, like that which has been waged against tuberculosis and syphilis, would be of great value; for a better understanding of the disease by parents and teachers would lead to more effectual protection of the child with rheumatic parentage and to recognition of the early manifestations both at home and at school. At the present time a child is too often regarded as rheumatic only after a cardiac lesion has developed, the rheumatism in its early stages having gone undetected. For the child with developed cardiac disease no sufficient provision is made. Dr. M. O. RAVEN pointed out in our columns recently[1] that children with rheumatic heart disease cannot be retained in hospital, neither are they suitable for treatment at home or in a convalescent home in most instances. He recommends that rheumatism should be made notifiable equally with tuberculosis, so that watch may be kept over all children with damaged hearts, and the conditions under which they receive treatment may be supervised. The schools for physically defective children have been doing good work for many years in connexion with heart cases of a certain severity. The children attending are under medical observation, are prescribed definite periods of rest, are given suitable education, and, finally, appropriate work is often found for them when they leave. Such schools, however, are available only in large towns and have a serious limitation set to their usefulness in that no control can be exercised over the children out of school hours. Special residential schools would meet this difficulty. The sites of these schools would have to be chosen with great care, due regard being paid to climate, to soil, and to the contour of the ground. They should be in the country but within easy distance of the large towns, and should be sufficiently large to make suitable education practicable. All that pertains to the physical welfare of the pupils should be under medical control. In this way they could be kept under observation and treatment, and at the same time educated. The amount of exercise and rest could be apportioned to each particular case, and the type of education chosen for each child according to its mental and physical ability. The clientèle of such an institution would require to be selected carefully, for many children with valvular disease can be regarded as of normal cardiac efficiency and should not be treated as invalids, whilst other children with hearts so crippled as to negative the chances of survival would be unsuitable. An important section of the pupils entering these schools would comprise children, discharged from hospitals or infirmaries, who have already benefited by treatment, but for whom the stay in hospital has necessarily to be curtailed below the desirable limit. In the United States and in Canada the problem of the rheumatic child is engaging attention and is being dealt with in a way which we would do well to emulate. An active educational campaign has been inaugurated and clinics established to the number of 37 in the city of New York alone. It is reported that in those clinics there are already as many patients in regular and active attendance as in the tuberculosis centres established 20 years ago.

[1] THE LANCET, 1922, i., 1241.

Annotations.

"Ne quid nimis."

ARSENICAL POISONING.

AT the last meeting of the Medico-Legal Society, a communication on Acute Arsenical Poisoning was read by Sir William Willcox, who has had exceptional opportunities for studying the toxicology of arsenic. Amongst the more important points emphasised in this paper were that following the administration of a fatal dose of arsenic, the symptoms and signs resulting from this dose may so exactly simulate natural disease that the diagnosis of acute arsenical poisoning becomes a matter of great difficulty. Further, even at a post-mortem examination in a fatal case, unless careful histological preparations are made, combined with a full analysis of the organs, there may be nothing to indicate that the individual has not died from natural causes. Although arsenic is usually classified as an irritant poison producing diarrhœa and vomiting, these symptoms are in reality less important than the rapid and serious damage to the liver, heart, and kidneys. The essential lesion in the liver is damage to the liver cell resulting in derangement of function, and this is a constant feature, whether the poison is in inorganic form or is some arsenobenzol derivative. Sir William Willcox was not alone among the speakers in referring to the dangers of the intensive treatment of syphilis with arsenobenzol derivatives: while the syphilis may be cured, there is a definite risk of permanent damage to the liver cells. The analyses of the various organs of the body in the poison cases cited were of some interest, the following points being especially worthy of notice. The liver in every case showed a larger percentage quantity of arsenic than any other organ, with the exception of portions of the alimentary tract when the dose had been quite recent. This absorption of arsenic by the liver is apparently protective to the rest of the tissues at the expense of the liver cell. The portion of the alimentary canal in which the largest amount of arsenic is found gives some indication of the time which has elapsed between the dose and death, also of the mode of administration. Only very minute quantities are found in the brain, lungs, and the bone. The absence of arsenic in the hair, skin, and nails is evidence against repeated or prolonged administration of arsenic, but the converse is not necessarily true, as it is almost impossible to prevent impregnation of the hair with fluids from the coffin or from sweat, both of which may contain arsenic. After medicinal doses of liq. arsenicalis or similar preparations, it is not common to find arsenic present in the urine and fæces after about 14 days.

The regulations for the sale of arsenic were considered by the meeting especially from the point of view of increasing their stringency, but owing to the extensive commercial uses of arsenic it was admitted that there

are bound to be leakages, when opportunities for murder and suicide as well as accident will inevitably occur. Another source of danger which must not be forgotten is the laboratory, where not only poisons but living cultures of pathogenic micro-organisms are available. Now that science is increasingly taught at schools and universities, it may become necessary to consider regulations with respect to laboratory material. The difficulties of providing legislation to limit free access to and from laboratories would be great. Regulations would inevitably hamper the honest worker, whereas, however carefully they were framed, it would be almost impossible to foil any would-be murderer who had access.

THE INTERDENTAL PAPILLA.

IT is important to realise that the triangular pad of gum which fills the space between the necks of the teeth prevents food from being forced between the teeth laterally, just as the contact points of the crowns of adjacent teeth prevent food from being jammed down by vertical pressure. Thus, in a normal mouth in which all the teeth are in contact and the interdental papillæ are intact, the chance of food collecting between the teeth is reduced to a minimum, despite the sticky character of so much of our modern foodstuffs. Where destruction of gum has already taken place as the result of pyorrhœa, then the defence against lateral impaction of food no longer exists, and under these conditions mechanical aid to remove it may be permissible. A recent issue of *School Health News*, a monthly pamphlet published by the Bureau of Public Health Education, New York City, in the course of an admirable article on the care of the teeth, rightly condemns the indiscriminate use of the toothpick on the ground that it may injure the interdental papilla. The point is an important one, and applies to all the various mechanical dodges for cleaning the teeth, many of which are liable to do as much harm as good. The important committee which is studying the whole question of the origin of dental caries will have something to say on this subject.

PULMONARY DECORTICATION IN CHRONIC EMPYEMA.

IN a recent number of *La Presse Médicale*, C. Lenormant reviews at some length the two chief methods of treatment of chronic empyema, including, on the one hand, surgical procedures affecting the walls of the thoracic cavity, from the simple rib resection of Gayet, Létiévant, and Estlander to the extensive thoracectomies of Schede and his followers, and, on the other hand, the pulmonary decortication method first described by Delorme in 1888. Decortication was slow in coming into favour, and it is only since the war that the method has attained any degree of popularity in France. The greatly improved results now being recorded are ascribed by Lenormant to four main factors: (*a*) The newer methods of examination, including radioscopy, pleuroscopy, and bacteriological examination of the pleural exudate enable more precise information to be obtained as to the size, shape, contents, and drainage of the pleural cavity and the state of the lung; (*b*) decortication is now undertaken at a much earlier stage when the operation, dangerous and even impossible in long-standing cases, is easy and practically bloodless; (*c*) operation is now only undertaken after having obtained a thorough disinfection of the pleural cavity; (*d*) less mutilating methods of thoracotomy are adopted than the extensive resections advocated by Delorme and Picqué. Lenormant adds that in certain cases pneumopexy is a valuable adjunct to the treatment, both in helping to maintain full expansion of the freed lung and also in arresting hæmorrhage where decortication has left a bleeding surface. The time taken to effect a complete cure is variable, ranging from the twenty-fifth to the fortieth day in the more favourable cases, and from two to eight months or even longer for the average patient. For the first few days after the operation there is usually a febrile reaction of some severity; sometimes dyspnœa, as in a case of Roux-Berger's; and always a hæmorrhagic or serous discharge necessitating drainage. The sequelæ generally disappear during the first week. Irrigation with Dakin's solution is advocated when the discharge does not clear up quickly. An important point in the after-treatment is to get the patient up as soon as the temperature becomes level, and to give respiratory exercises of all kinds. Heliotherapy, when available, is often useful. As to the end-results of decortication, opinions differ as to the degree of functional activity attained by the affected lung. Lenormant's view is that, judging from stethoscopic and X ray evidence, the lung completely regains its functional powers, this conclusion being borne out by a case published by Tailhefer in October, 1921, in which the aeration and anatomical integrity of the lung were established at the post-mortem six years after the operation. In any case Lenormant believes the results of decortication to be in these respects incomparably better than those afforded by thoracoplasty or thoracectomy alone.

TRANSFUSION OF ANIMALS' BLOOD.

WHEN, during the seventeenth century, the attention of the medical profession was first being directed to the possibility of blood transfusion, animals were invariably used as blood donors. The accounts written by these early experimenters contain clear descriptions of the symptoms produced in human beings by the transfusion of an incompatible blood, even the attendant hæmoglobinuria being noted. These untoward symptoms afterwards led to the discrediting of transfusion as a therapeutic measure. During the nineteenth century, when the proceeding was being revived, further attention was given to the use of animals' blood, but only with the result that it was again discredited. Recent advances in knowledge of the technique of blood transfusion has resulted in its more general use, but no attempt was made to revive the use of animals' blood with the addition of an anti-coagulant until the present year, when experiments were carried out at Bordeaux by Prof. Cruchet, who recorded them at the recent medical congress of the Royal Institute of Public Health at Plymouth. Prof. Cruchet first transfused small quantities of the blood of one kind of animal into the veins of another, transferences such as ox to rabbit, dog to rabbit, ox to dog, sheep to dog, and so on, being made. In about half of 13 such experiments the receiving animals suffered from symptoms, more or less severe, of shock resembling anaphylaxis, and five of the animals died. Nevertheless, Prof. Cruchet was encouraged by his results to suppose that animals' blood might safely be transfused into human beings. He accordingly administered sheep's blood to six of his patients, and he obtained exactly the same results as were recorded by his predecessors in the seventeenth century. He was content to give comparatively small quantities of blood, but sufficient to provoke the usual symptoms of poisoning which attend the introduction of a foreign protein into the circulation. He records also the occurrence of hæmoglobinuria in two patients and severe urticaria in one. In view of these results, Prof. Cruchet is, perhaps, somewhat bold in claiming that animals' blood may be safely substituted for human blood in transfusions. The transfusion of sheep's blood in a quantity such as is used in the treatment of hæmorrhage and shock would undoubtedly result in the death of the patient. Prof. Cruchet has, indeed, shown that some benefit, such as a rise in the number of red blood cells, may sometimes be noted in a debilitated patient who has been subjected to "protein shock" by the injection of animal's blood, but it may be questioned whether this form of shock has any advantage over that produced by the intra-

venous injection of peptone solution, as practised for some time by Dr. A. E. Gow.[1] In any case the dangers of the proceeding can scarcely be exaggerated, and the therapeutic use of animals' blood should only be practised with great circumspection. Modern refinements of knowledge concerning incompatible bloods and blood groups are apparently ignored by Prof. Cruchet when he advocates a return to the crude methods of three centuries ago.

A YEAR'S WORK OF THE ROCKEFELLER FOUNDATION.

FROM the review of work for 1921 just issued by the Rockefeller Foundation we learn something of the world-wide activities of the Foundation in regard to preventive medicine, to the training of public health personnel, and to medical education and public health generally. During the year a quarter of a million dollars were granted to the School of Hygiene and Public Health of Johns Hopkins University, two million dollars were pledged to Harvard for a School of Health, and contributions made to public health training in Czecho-Slovakia, Brazil and the United States. The Pasteur Institute of Paris was helped in recruitment and training of personnel; an experimental pay clinic was underwritten in the Cornell Medical School; a complete modern medical school and hospital in Peking were formally opened; 25 other medical centres in China were assisted; surveys were made of the medical schools in China, Japan, the Philippines, Indo-China, Straits Settlements, Siam, India, Syria, and Turkey. A million dollars were promised for the Medical School of Columbia University. The Foundation also contracted to appropriate three and a half million dollars for the rebuilding and reorganisation of the medical school and hospital of the Free University of Brussels; supplemented the laboratory equipment and supplies of other five medical schools in Central Europe; supplied American and British medical journals to 112 medical libraries on the Continent; provided 157 scholarships in hygiene, medicine, physics, and chemistry. The campaigns against yellow fever and hookworm disease were continued; the goal of transferring to French agencies anti-tuberculosis organisations in France was brought nearer; and many other matters of direct interest in the promotion of the health and well-being generally, and much team-work for world health were undertaken. Not the least interesting parts of the report are the remarks on health training at home and abroad, changing ideals of health, progress in prevention, the responsibility of the public, and the rôle of the nurse in cure and prevention.

EFFICIENT VACCINATION.

IN order to be of value for protective purposes against small-pox the operation of vaccination must be thoroughly carried out. The ordinary patient does not know what a proper and sufficient vaccination consists of, and medical men must not allow themselves to be drawn into the performance of this operation in a haphazard and perfunctory fashion. The benefit of multiple insertions has been proved many years ago by Marson, Gayton, Cory and others. The more thorough the vaccination the more pronounced will be the immunity and the longer will it be effective. The examination of smallpox patients in hospitals has shown that those who have only a small scar of vaccination are more numerous, and have the disease more severely than those who show a higher number of scars. Imperfect vaccination in a community is almost worse than no vaccination at all, for the immunity is short-lived and the individual who imagines himself protected is not really so. When small-pox appears and those with imperfect immunity are attacked, as they frequently are, advantage is taken of the fact by the anti-vaccinators to show that vaccination has no protective influence. It is the duty, then, of the medical man to explain to his patients who, through ignorance, put forward a request for one or two insertions why the Government requirement aims at producing good-sized vesicles of a total area of not less than half a square inch. Teachers of vaccination under the Ministry of Health have been for years urging on medical students the value of four insertions in all cases. It is hoped that all medical men who have been so taught, and who know the value of vaccination when efficiently carried out, will not give way to ill-informed pressure, but endeavour to educate the public to maintain the high standard of efficiency laid down by the Ministry of Health. It is thought that some supervision might be exercised by the Ministry of Health in regard to the manufacture of commercial vaccine lymph as regards its preparation and potency, so that it may reach as high a standard as that issued by the Government Lymph Establishment.

[1] Quart. Jour. Med., xiii., 49, 82.

A HOSPITAL FOR GENTLEWOMEN.

THE gap between the expensive nursing home and the voluntary hospital is still wide, and the disposal of the gentlewoman who shrinks from public wards but has not the means to pay for the privacy which she covets when ill is one of the most difficult problems her doctor has to tackle. St. Saviour's Hospital for ladies of limited means contains 21 beds in two wards and three private rooms, the charges to patients varying from 2 to 5 guineas. Of the active medical and surgical staff, who give their services gratuitously, five are also on the staff of the Middlesex Hospital, which hospital appears long to have been a willing recruiting ground for St. Saviour's; names of the members of the consulting staff are further testimony to the fatherly interest taken by the larger institution in the smaller. The history of St. Saviour's is romantic. It was erected by Dr. Pusey in the middle of last century to house a religious community of women, under vows, in the Church of England. Originally a home for the sisters, it was adapted as a hospital in 1877 and was taken under the control of the All Saints Community in 1892, whence it passed to the Sisters of the Community of the Epiphany in 1913. A feature of the building is the wood-carving in the chapel, which dates from the early seventeenth century. The carving was begun by two Carthusian monks in a small monastery in the Alps in 1600, and it took 50 years to complete the remarkably fine work which has been reassembled here, and is well worth inspection.

The conditions of admission to St. Saviour's involve only the signing of three forms—a certificate from the patient's medical attendant, another showing that she is eligible to the hospital, and an undertaking by some responsible person to pay weekly fees in advance. Chronic, incurable, infectious, maternity, mental, epileptic, and throat, nose, and ear cases are not taken, nor are emergency cases received as a rule. There is a well-equipped operating theatre, and though the administration is in the hands of a religious sisterhood, the actual nursing is under the care of fully trained nurses. Practitioners are invited to recommend suitable patients for admission. St. Saviour's Hospital is unendowed; subscriptions and donations should be sent to the hon. secretary, Sir Cyril Cobb, at the hospital, Osnaburgh-street, London, N.W. 1.

LEAD POISONING IN THE POTTERY INDUSTRY.

DISAPPOINTMENT must be felt that the number of cases of lead poisoning in the pottery industry notified to the Chief Inspector of Factories has increased during the last two years, and particularly in 1921. The subject was raised by Mr. Charles Sitch in the House of Commons when he drew particular attention to the increase in fatal cases, of

which there were 13 in 1920 and 11 in 1921, as compared with 6 in 1914. The pottery industry is one to which a particularly stringent code of regulations applies for the prevention of lead poisoning. Since this code was established in 1913 a decided diminution in the number of cases notified has resulted; thus the annual average for the years 1909–11 was 76, while there were only 21 cases in 1919, and 24 in 1920. The cases fell even lower during the war, but this period was abnormal. The continued occurrence of fatal cases, and indeed their pronounced increase, is of special interest. Examination of the length of employment of these workers before death showed that only one (in which there is doubt whether nephritis, the cause of death, was of industrial origin) commenced work since the present regulations came into force, while the average length of employment in the industry of nine victims was 34 years; a second case had been employed in another industry for eight years before death. These cases show that for a chronic poison like lead many years must necessarily elapse before the benefit of improved conditions can find expression in mortality data. Since the paramount influence in the causation of lead poisoning was definitely determined, namely, that it is the inhalation of lead dust, an extremely satisfactory reduction in cases of industrial origin has taken place, but as long as lead is used in industries risk must exist. The hope, however, may be expressed confidently that steady application of the principles of prevention, now well recognised, will continue to hold in check and further reduce the ravages of this particularly harmful industrial disease.

"THE RISK."

THE risk that a play recently produced under this name could seriously undermine the confidence of the public in the medical profession need not, we think, disturb even the youngest and most sensitive of those who hope to enter its ranks. The characterisation—in the English version at any rate—is too exaggerated to carry conviction, and the production makes its main appeal as good melodrama. "The Risk" has been adapted from "La Caducée," a play by André Pascal (Baron Henri de Rothschild), on which we commented [1] when it appeared in Paris last year. The story is that of the rise and fall of a typical adventurer of the professional classes, who happens in this case to be a doctor. The successful treatment of the well-connected victim of a street accident leads to an introduction to a certain Leroux, and subsequently to an alliance with him which does little credit to either party. Leroux lends Dr. Revard money to set up as a consulting surgeon, and proceeds to make him the fashion by inspired press articles and much personal canvas among the women of the smart set. Unfortunately for the doctor, Leroux demands quick returns, and in order to meet an ever-increasing debt Revard is tempted to cast aside one by one the standards which guide normal professional conduct. He consents to exhibit in his fine consulting-room spurious antique furniture, which commands a ready sale from such a setting. He offers general practitioners a commission on the fees of the patients they send him, allows a personal element to enter into his relations with women patients, and encourages patients to continue their visits when they are quite well. Eventually he admits to his private nursing home a healthy, wealthy, and not very wise young woman, and operates on her for "peritonitis" solely for the sake of the fee he can extract. Peritonitis following instead of preceding the abdominal section, the patient dies. Whereafter the surgeon, characteristically enough, chooses a method of suicide which will give him the notoriety he loves, as a martyr to science. In this respect he appears successfully to have bluffed even the dramatist who created him, since it does not seem clear that the new toxin could not equally well have been tested on an experimental animal.

[1] THE LANCET, 1921, ii., 28.

We found it difficult to believe in this qualified adventurer, though Mr. Bourchier did his best to make him a real person. Even more difficult to accept was the pompous old gentleman, of the faculty of medicine, who apparently thought an evening party an appropriate scene for a sermon on medical ethics complete with well-worn denunciations of the smart set. It is only fair to add that the audience seemed well satisfied with this indictment of the modern craze for sensation, and that some of them at least were able to take Dr. Revard seriously. They reminded each other a little uneasily that, after all, operations are seldom decided on without consultations, and that few doctors have any financial interest in nursing homes. It was obvious, however, that the first visit from their own well-trusted family doctor would re-establish firmly faith in the integrity of a profession which is unlikely to suffer loss of prestige from any dramatic misrepresentation. As a matter of fact, medicine escapes very lightly on the stage. The typical representatives of the law or the church are hardly flattering to those learned professions. The unworldly, absent-minded clergyman is too often used as comic relief; the stage lawyer is fussy and ridiculously precise, if, indeed, he has not absconded with the family fortune before the play begins. The stage doctor is usually a dignified and trustworthy figure, except in a few frankly artificial detective plays which require a villain with schemes so cunning that only misplaced scientific knowledge could have invented them. It would be ungrateful indeed to object to an occasional picture of the doctor as rogue.

THE PLIGHT OF RUSSIAN DOCTORS.

THE plight of many Russian medical men and their families is severe and the appeal being made to their English colleagues by the British Medical Association should meet with sympathetic response. We publish in the front of this issue an account by Prof. V. A. Oppel, of Petrograd, of some experimental work which is only a small section of the researches he has pursued under the most disheartening circumstances. Some of his colleagues are doing equally good work while others are reduced to such a condition of misery that work is impossible. Food and clothing are urgently needed by 65 medical men whose names have been collected by the American Relief Association. The Russian medical societies have apparently made great efforts on behalf of the local doctors, but they have reached the end of their resources. We trust that a real effort will be made to give help.

THE Lord Chancellor has appointed a committee to report upon the changes which are desirable in the existing law, practice, and procedure relating to criminal trials where a defence of insanity is raised. The members of the committee are Sir Ernley Blackwell, Sir Archibald Bodkin, Sir Richard Muir, Sir Ernest Pollock, Sir Leslie Scott, Sir Herbert Stephen, and Sir Edward Troup, with Lord Justice Atkin as chairman.

A RECOMMENDATION has been addressed to the Privy Council under Clause 1 (4) of the Dentists Act, 1921, that this section shall come into operation on Nov. 30th instead of on the expiration of one year from the commencement of the Act, namely July 28th, 1922. It is expected that the decision of the Privy Council upon the matter will be announced in the course of a few days.

SMALL-POX IN YORKSHIRE.—There are now five patients in the Barnsley isolation hospital. They are all children who had not been vaccinated. The outbreak occurred at Wooley, near Barnsley.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—The last post-graduate lecture of the session will be given by Mr. Victor Bonney, at the house of the Royal Society of Medicine, 1, Wimpole-street, London, W. 1, on July 19th, at 5 P.M., the subject being, Myomectomy as opposed to Hysterectomy.

ROYAL SOCIETY OF MEDICINE:

REVIVAL OF THE ANNUAL DINNER.

THE annual dinner of the Royal Society of Medicine was held on Thursday, July 6th, at the Hotel Victoria, London, when Sir John Bland-Sutton, whose successful term of office as President is drawing to a close, presided over a large company of the Society and a representative list of guests.

The first event of the occasion, after the drinking of the loyal toasts, was the presentation of the Jenner Medal to Dr. John C. McVail. This medal was instituted in 1896 and is awarded on the recommendation of the Section of Epidemiology and State Medicine of the Society to "persons whose work has been prominent in the prevention and control of epidemic disease." Sir John Bland-Sutton, in presenting the medal, amidst the applause of the company, mentioned that only four persons had previously been its recipient—namely, W. H. Power, Laveran, Patrick Manson, and Shirley Murphy—so that Dr. McVail was joining a select band and was the first to do this from beyond the Tweed. Dr. McVail replied with no allusions to the personal work which had gained him the medal, though he laid stress on the enormous value to the world of Jenner's great discovery and pointed to the confirmation of this which recent work had brought about.

Sir JOHN BLAND-SUTTON then proposed "Prosperity to the Royal Society of Medicine." He indicated the troubles in which the great combination of London medical societies had been involved by the stress of the war, following so quickly after the enormous expenses of consolidating their position and completing their new house. He expressed himself happy to think that during his time of office financial stress had been relieved, and concluded a warmly-applauded speech by humorously but half-earnestly suggesting that, if Æsculapius were reincarnated, he would make straight for his beautiful temple at No. 1, Wimpole-street, would note his statue, alas! only in plaster, in the hall, and would proceed directly to the secretary's office to congratulate Sir John MacAlister, to whose efforts so much had been due.

Sir HUMPHRY ROLLESTON proposed the toast of "The Kindred Societies," indicating briefly the points at which they came into immediate contact with the Royal Society of Medicine. He asked his audience to note that he alluded to the Hunterian Society (1819) and the Harveian Society (1831), placing the surgeon before the physician because of the dates at which the societies were instituted. He reminded his hearers that the West London Medico-Chirurgical Society, by its title, would be associated in everyone's mind with the great society which was the nucleus of the present Royal Society of Medicine, and alluded to its President, Sir Lenthal Cheatle, as a descendant of Sir William Lenthall (1591–1662), Speaker of the House of Commons, and well fitted by heredity to fill a presidential chair. He coupled with the toast the name of Mr. James Berry, whom he described as "our Mr. Berry," as being not only President of the Medical Society of London, the senior medical society in the metropolis, but also an office-bearer in the Royal Society of Medicine.

Mr. BERRY replied in a picturesque speech in which he alluded to the various societies as forming stars in a scientific firmament. He applied the terms "splendid comets" to the distinguished foreign doctors who "from time to time visit us from distant realms, shine upon and enlighten us for all too brief a period, and then pass away again to regions unknown, he feared, to many of those present." Sir John MacAlister was likened to the sun-god, Phœbus Apollo, the charioteer, who helped to guide the course of the Society; Apollo being also the patron of physicians and shepherds and, incidentally, the father of Æsculapius. The Medical Society's representative was likened to some modest but learned dame of ancient lineage visiting the house of her illustrious grown-up daughter. The latter lived in a sumptuous mansion and was dressed in gorgeous raiment, but, like many a titled lady of fashion, had sometimes a little difficulty in paying her dressmaker's bills. She was still unmarried, having not yet come across that wealthy philanthropic suitor, be he British or American, who would doubtless bring with him that rich endowment which she so sore needed. But Mr. Berry hoped that such an one might be on his way to her.

Sir THOMAS HORDER proposed the toast of "The Guests" and supplied Sir Alfred Mond with an excellent theme on which to frame a reply when he suggested that the Ministry of Health ought "to get busy," despite the acknowledged value of expectant treatment in many serious cases.

The MINISTER OF HEALTH briefly but conclusively showed that there was no lack of business in his office, though its numerous activities had escaped fortunately under the threats of the Geddes axe. At a time when there was, on the one hand, so much to be done and, on the other, such necessity for economy, the Minister of Health had been able to obtain from the Chancellor of the Exchequer the funds necessary to continue the maintenance of maternity homes, the treatment of tuberculous and venereal diseases, and the welfare care of children. Further, during his time of office the cause of scientific education and the progress of medicine had been immensely strengthened by the action of the Rockefeller Trustees, whom he had been able to induce to make a donation of $2,000,000 for starting a model school of hygiene in London, while he had secured from the Chancellor of the Exchequer an endowment sufficient to render the new institute a great factor in research, both into general problems of hygiene and into those of tropical disease. Sir Alfred Mond concluded his speech by drawing a vivid picture of the conditions in large regions of Russia, ravaged by typhus fever and suffering the concomitant horrors of starvation, and lack of medical and material aid. His department, he said, were working at a scheme for the international organisation of medical assistance with a view to stem the flood of disease which had already overflowed the borders of Poland and threatened to engulf Europe.

Lord RIDDELL, replying also for the guests, acknowledged the horror of the picture drawn by Sir Alfred Mond, but stated his intention of remaining relentlessly optimistic. He displayed the intention by telling two excellent stories.

The health of "The President of the Society" was proposed by Sir JOHN GOODWIN, Director-General of the Army Medical Services and President of the Section of Army Medicine in the Society, to which Sir JOHN BLAND-SUTTON briefly replied.

The following is the list of the guests of the Society:—

Sir Alfred Mond, Minister of Health; H. H. Maharaj Rana Sir Bhawani Singh Bahadur of Jhalawar; Dr. John C. McVail; Prof. H. S. Birkett (Dean of the Faculty of Medicine, McGill University, Montreal); Prof. A. F. Hess (New York); Dr. Henry Dwight Chapin (New York); Sir David Murray, R.A. (President of the Royal Institute of Painters in Water Colours); Sir Rickman Godlee; Lord Riddell; Sir Arthur Stanley; Mr. H. J. Waring (Vice-Chancellor of London University); Sir Archibald Garrod; Sir Humphry Rolleston; Sir Anthony Bowlby; Mr. James Berry (President of the Medical Society); Mr. J. H. Fisher (President of the Ophthalmological Society); Sir Lenthal Cheatle (President of the West London Medico-Chirurgical Society); Dr. D. M. Barcroft (President of the Chelsea Clinical Society); Sir George Makins (President of the Fellowship of Medicine); Dr. C. Hubert Bond (President of the Medico-Psychological Association); Mr. G. H. Livesey (President of the Central Veterinary Society); Prof. Sir Arthur Keith; Colonel Stuart Sankey, J.P. (Remembrancer of the City of London); Mr. Henry S. Wellcome; Mr. H. A. Gwynne; Mr. Thomas Marlowe; Sir Squire Sprigge; Sir Dawson Williams; Mr. Samuel Lithgow (solicitor to the Society); Mr. F. W. Lord (Auditor to the Society); Sir John Y. W. MacAlister. The guests of individual members of the Society included Sir

Anthony Hope Hawkins, Alderman Frears, Baron Profumo, and the Rev. Stephen Winter, while many prominent members were accompanied by their wives.

The following is a list of the members present :—

Miss Aldrich-Blake, Dr. Arkle.

Mr. Aslett Baldwin, Sir Charles Ballance, Dr. H. W. Barber, Sir Percy Bassett-Smith, Dr. Bayne, Dr. Bell, Capt. Benbow, Mr. Layton Bennett, Mrs. Berry, Dr. Bierring, Dr. Bingley, Dr. T. C. Blackwell, Sir Layton Blenkinsop, Dr. R. A. Bolam, Dr. Helen Boyle, Dr. Charnock Bradley, Dr. Pierre Brès, Dr. Bridges, Prof. H. Briggs, Sir Charlton Briscoe, Mr. W. J. H. Brodrick, Dr. Langdon Brown, Dr. J. Brownlee, Mr. C. H. Bubb, Sir George Buchanan, Mr. F. F. Burghard, Dr. Burnet, Col. Wm. Butler, Dr. Farquhar Buzzard.

Dr. H. J. Cates, Dr. G. C. Cathcart, Dr. Aldo Castellani, Dr. C. W. Chapman, Mr. Arthur Cheatle, Mr. C. C. Choyce, Prof. Christiansen, Dr. Christopherson, Mr. Ernest Clarke, Mr. A. L. Clarke, Mr. F. J. Cleminson, Dr. H. A. Clowes, Dr. F. W. Cock, Dr. R. H. Cole, Dr. Jas. Collier, Dr. S. A. Monckton Copeman, Mr. C. V. Cotterell, Dr. Cumberbatch, Dr. C. G. Cumston.

Dr. Kaye Davison, Lord Dawson of Penn, Dr. Devine, Dr. Lawson Dick, Dr. Francis Dixon, Dr. Leonard Dobson, Dr. R. Donaldson, Dr. S. E. Dore, Dr. G. M. Dorrance, Dr. Elgar Down, Sir James Dundas-Grant, Mr. Percy Dunn.

Dr. T. Watts Eden, Dr. J. Ensor, Col. Perry Evans.

Mr. C. H. Fagge, Mr. H. A. T. Fairbank, Dr. Anthony Feiling, Dr. A. F. Forster, Dr. David Forsyth, Mr. W. F. Fox, Prof. F. R. Fraser, Mr. E. P. Furber.

Mr. W. B. Gabriel, Mr. Leonard Gardiner, Lt.-Col. Garwood, Prof. E. Gibson, Dr. Giles, Dr. Gilroy, Dr. Alison Glover, Capt. Godfery, Dr. E. W. Goodall, Sir John Goodwin, Sir Charles Gordon-Watson, Dr. A. E. Gow, Dr. A. M. H. Gray.

Sir William Hale-White (President-Elect of the Society), Col. C. B. Heald, Dr. Maynard Heath, Dr. E. W. Hedley, Mr. J. P. Hedley, Dr. Wm. Hill, Prof. Hobday, Capt. C. F. Hobday, Dr. Eardley Holland, Dr. C. W. M. Hope, Mr. Montagu Hopson, Sir Thomas Horder, Mr. Cyril Horsford, Dr. Whitchurch Howell, Dr. F. P. Hughes, Dr. Howard Humphris, Dr. A. F. Hurst, Dr. Robt. Hutchison, Mr. John Hyde.

Mr. A. Carlyle Jackson, Dr. Walter Jagger, Mr. W. W. James, Mr. Raymond Johnson, Prof. T. B. Johnston, Dr. Isaac Jones, Dr. Hill Joseph.

Dr. W. P. Kennedy, Mr. Frank Kidd, Capt. Hamilton Kirk, Mr. J. Kitching, Mr. C. Heygate Knowles, Dr. R. Knox, Prof. Korenchewsky.

Sir Arbuthnot Lane, Dr. F. Langmead, Mr. T. B. Layton, Dr. Lennane, Dr. Murray Levick, Mr. E. A. Lindsay, Dr. Graham Little, Dr. Lynham.

Dr. A. Macgregor, Dr. Ridley Mackenzie, Dr. Ewen Maclean, Dr. J. M. H. Macleod, Sir William Macpherson, Mr. J. D. Malcolm, Dr. Mapother, Col. J. F. Martin, Dr. McCallan, Dr. F. J. McCann, Dr. Campbell McClure, Dr. McCullough, Prof. L. McIlroy, Mr. W. H. McMullen, Dr. Elizabeth McVail, Mr. Ernest Miles, Sir William Milligan, Mr. P. H. Mitchiner, Dr. Irwin Moore, Sir Frederick Mott, Mr. J. Howard Mummery, Dr. Bernard Myers.

Sir Arthur Newsholme.

Mr. W. H. Ogilvie, Mr. J. F. O'Malley.

Mr. H. J. Paterson, Dr. M. Paterson, Mr. Norman Patterson, Mr. A. E. Payne, Miss Ivy Peters, Lt.-Col. Marriam Perry, General E. M. Pilcher, Mr. Powell, Dr. Eric Pritchard.

Dr. Radcliffe, Dr. P. N. Randall, Dr. Burnett Rae, Dr. M. B. Ray, Lt.-Col. Forbes Rait, Mrs. Ray, Dr. Nathan Raw, M.P., Dr. R. Reece, Dr. C. A. Robinson, Dr. A. C. Robinson, Dr. John Robertson, Dr. Cecil Rowntree, Dr. R. G. Rows, Mr. Rowe, Sir Charles Ryall, Mr. Archer Ryland.

Mr. A. L. Sachs, Dr. Agnes Savill, Mrs. Scharlieb, Mr. C. Schelling, Dr. H. C. Semon, Mr. T. Skipper, Comm. Neville Smart, Dr. Lapthorn Smith, Dr. C. F. Sonntag, Mr. Walter G. Spencer, Dr. Herbert Spencer, Dr. A. Spicer, Mr. Maxwell Stephens, Col. P. G. Stock, Mr. Lewis Stroud, Mr. W. Stuart-Low.

Dr. Jas. Taylor, Mr. H. Tilley, Dr. E. D. Townroe, Mr. A. H. Trevor, Dr. P. C. Tribe, Dr. de Bec Turtle, Mr. Philip Turner.

Dr. Vassie.

Capt. Ainslie Walker, Sir J. Thomson Walker, Dr. Harold Waller, Mr. C. Edward Wallis, Mr. W. H. S. Wallace, Dr. Sim Wallace, Mr. George Waugh, Mr. Beckwith Whitehouse, Dr. J. R. Whait, Mr. E. F. White, Lt.-Col. E. W. Wilkinson, Dr. H. Williamson, Sir Frederick Willis, Dr. Kinnier Wilson, Dr. Thos. Wilson, Dr. Guy Wood, Mr. Garnett Wright, Dr. Maurice Wright.

The dinner was a really distinguished one, served in circumstances of great comfort, and the quotations on the menu card were witty and apt.

BRITISH CONGRESS OF OBSTETRICS AND GYNÆCOLOGY.

DISCUSSION ON THE PROGNOSIS AND TREATMENT OF ECLAMPSIA.

(*Concluded from p. 92.*)

AFTER opening remarks by Mr. HAROLD CLIFFORD, President of the Congress, the chair was taken at the session on June 30th by Prof. HENRY BRIGGS, President of the Section of Obstetrics and Gynæcology, Royal Society of Medicine.

Dr. WATTS EDEN read the report of the London subcommittee on the Treatment of Eclampsia, a full abstract of which has already been published in this journal (see THE LANCET, July 8th, p. 89 et seq.).

The reports of the subcommittees representing the Edinburgh Obstetrical Society, North of England Obstetrical and Gynæcological Society, and the Midland Obstetrical and Gynæcological Society were prepared on similar lines to those of the London report, and on the whole pointed to the same conclusions. The report from the Edinburgh Obstetrical Society, presented by Dr. H. S. Davidson, dealt with 148 cases, of which 37 died, a mortality of 25 per cent. Prof. Ewan Maclean read the report from the Midland Obstetrical and Gynæcological Society based on 140 cases, the maternal mortality being 28·5 per cent. Dr. H. Leith Murray presented the report of the North of England Obstetrical and Gynæcological Society, comprising 804 cases from Leeds, Liverpool, Manchester, and Sheffield. The maternal mortality was 24·43 per cent.

Analysis of treatment was impracticable owing to the widely-scattered centres from which the cases were collected, but the Committee were strongly of the opinion that medical treatment in the form of elimination, simple water diet, and natural delivery, assisted if necessary by low forceps extraction, gave a much lower mortality than induced labour or any of the forms of accouchement forcé or Cæsarean section. As regards the results of treatment the Committee did not feel justified in making any statistical synopsis. They considered that the accumulated figures were capable of great misinterpretation and agreed that only those actually in charge in numbers of cases, and particularly those who had carried out a uniform line of treatment for the majority of cases under their care, were in a position to make useful recommendations. The figures showed, however, that medical measures, combined in some cases with mild obstetrical procedures, were being more generally adopted.

Dr. BETHEL SOLOMONS read a paper on

The Results of the Treatment of Eclampsia by the Dublin Method.

The intern statistics of the Rotunda Hospital were taken as a working basis, as the treatment there is so supervised and such reliance can be placed on its being carried out rigidly in every detail. The series comprised 204 cases from 1903 until 1921, and the method employed, with some slight exceptions, was uniform all through. In the last two years of the mastership of Dr. Hastings Tweedy, which coincided with the first two years of his period as Assistant Master, there were 29 cases, many of a very serious nature, with no deaths. He specially dealt with the diagnosis of the disease which rested on data as laid down by Dr. Tweedy.[1]

The treatment, he said, must be meticulously carried out. The busy specialist summoned to the country may obtain results, life or death, having performed Cæsarean section or induction of labour and may then hurry back to his work, but surely he is not justified in this when the results obtained by the Tweedy treatment have been unsurpassed. The main points of the treatment are: (1) Starvation from everything except water. The food ingested and the toxic elements from the fœtus require the same ferments in

[1] Tweedy and Wrench: Practical Obstetrics, p. 525.

the blood to neutralise them; the fœtal toxin takes some of the elements from the blood intended for the digestion of food which leaves the latter with no ferment, and therefore the food acts as a toxin. The starvation should be continued for three days, after which if there is no improvement, then, and not till then, should Cæsarean section or induction be recommended. (2) Stomach lavage. (3) Bowel lavage. These are most important. The speaker emphasised the exact method of carrying out these manœuvres. (4) Morphine. The value of this drug is at present sub judice. (5) Injection of sodium bicarbonate solution under the breasts should be done in all but the mildest cases. (6) Close observation of the patient. This should be done, if possible, by a qualified doctor or, failing him, by a senior student or nurse thoroughly trained in eclampsia. This care will avoid many deaths from drowning by mucus. Nothing must be given by mouth to the unconscious patient. He demonstrated that the less the number of fits the greater the chance of recovery, therefore fits must be controlled. The treatment suggested will control fits and allow time for the natural efforts of the body to split the toxin into some simpler product and thus render it innocuous. With regard to mortality, in Dr. Tweedy's mastership the intern mortality rate was 8·82 per cent. in 68 cases, while if the extern results were included the rate fell to 8 per cent., and there were no deaths in the last 29 cases, showing the better results following improved technique. Dr. H. Jellett's percentage was 12·85 in 75 cases. Sir W. Smyly and Dr. Tweedy jointly, during the war, had 33 cases with 9·09 per cent. mortality and Dr. G. FitzGibbon has 33 cases with the same rate. The Coombe Hospital, which followed to some extent the Rotunda treatment, had 9 cases in four years with 2 deaths. In conclusion, Dr. Solomons said there was no doubt that the death-rate from eclampsia could be kept at a lower level by following closely the treatment as suggested by Dr. Tweedy, especially by watching the patient as a cat would a mouse for any signs of interference with respiration by mucus. It was also beyond doubt that the practitioner must meet with some cases so saturated with this pseudo-acidosis that recovery was impossible, but the number of these would be greatly diminished were routine general examination insisted on, especially examination of the urine. The general practitioner required further education on this point.

Dr. HERBERT SPENCER said that the reporters were to be congratulated upon the enormous number of facts which they had set before the Congress. The Dublin report had struck him as extremely interesting. He had always thought that Dr. Tweedy's method of treatment was one that should be adopted, and had himself used it for some years past with some modifications. He would like to ask Dr. Solomons how many of the cases were said to be eclampsia although they did not have fits, simply because they were in a state of coma.

Dr. LAMOND LACKIE said he did not believe in using chloroform in eclampsia. In any toxic condition chloroform was a mistake. If an anæsthetic was needed he was quite certain that ether should be given. The determining factor in producing the fits was high blood pressure, and for the treatment of this he pinned his faith to veratrone. He was of opinion that 1 c.cm. was a dangerous dose and that not more than ½ c.cm. should be given. It was an extraordinary thing that in general medicine veratrone did not seem to have the same effect as in eclampsia. He had asked several physicians in Edinburgh to tell him their experience of veratrone in albuminuria; they had got no result at all; in fact, it almost seemed as if this drug, which was a strong nervous and cardiac depressant, had also a specific effect in the treatment of eclampsia. He did not like morphia, but it had its uses. He had found pilocarpine useful in spite of its dangerous reputation, especially in cases where there was slight œdema or no œdema at all. Even in some cases where the œdema was marked he had found it act like a charm. He agreed that active obstetric treatment should only be employed when it was absolutely necessary; in the great majority of cases when the patient went into labour very little help was required.

Dr. J. W. BALLANTYNE (Edinburgh) said that "incurable but preventable" was a short description of the present position of eclampsia. Albuminuria was still the great distant danger signal; high blood-pressure and epigastric pain were the near danger signals. In 1921, in connexion with the Edinburgh Royal Maternity Hospital, there were not more than 28 cases of eclampsia out of 2700 women admitted. Rather more than 900, or about a third, of these women attended the ante-natal clinic or had treatment in the ante-natal beds and of these 254 had albuminuria. Only one of these patients developed eclampsia and she had received no preventive treatment.

Prof. THOMAS WILSON (Birmingham) said that nothing new was brought out by the statistics which had been collected with so much labour. As to the premonitory symptoms of eclampsia, these occurred in the vast majority of cases. Very occasionally there were none. He considered that a diagnosis of eclampsia without albuminuria was to be received with great distrust in the absence of a post-mortem examination. In his experience high œdema was not very commonly found before eclampsia; usually the œdema was very slight. Increased diastase in the urine was a valuable premonitory symptom. Severe epigastric pain and amblyopia were not premonitory symptoms, but symptoms of developed eclampsia, as could occasionally be demonstrated post-mortem. The eliminative treatment was that generally adopted in Birmingham, but he thought the hope in the future lay, as Dr. Ballantyne had pointed out, in treating the albuminuria symptoms as they arose.

Dr. J. S. FAIRBAIRN (London) dealt with the degree of albuminuria in relation to prognosis. In most of the cases a high degree of albuminuria was a sign of severity, but this was not invariably found and thus all cases of albuminuria, however slight, ought to come under observation and investigation. He was not sanguine that eclampsia could be prevented until more was known about the disease. Some cases came on with great suddenness and little warning.

Mr. FURNEAUX JORDAN (Birmingham) said that out of 166 cases at the Birmingham Maternity Hospital 114 had warning symptoms, and only 5 out of the 114 had sent for a medical man until just before they were admitted to hospital. He thought that all doctors and midwives should warn patients of the possibility of these symptoms. When asked whether a woman who had had eclampsia could safely have another baby he raised no objection, but placed her on a diet of milk, butter, and cheese and no meat. He had not seen eclampsia occur twice in the same patient, but he knew of two cases of eclampsia at a first confinement followed by several normal deliveries.

Mr. FREDERICK EDGE (Birmingham) suggested that the after-results of eclampsia should be noted in future reports. He recalled a doctor's wife who had epilepsy following what appeared to have been a marked eclamptic attack. Any effect on the eye might be illuminating. It was certain that many people who apparently got well suffered permanent damage.

Miss FRANCES IVENS (Liverpool) agreed with those who considered that in advanced cases Cæsarean section was useless, but considered that in pre-eclamptic conditions or in the early stages of eclampsia it was the most satisfactory method of treatment. Miss Ivens described three cases treated in this way.

Mr. CLIFFORD WHITE (London) wished again to emphasise the value of the bicarbonate tolerance test to which he had drawn attention in THE LANCET (1920, ii., 1248). It seemed to give the earliest indication of the presence of acidosis and was easy to carry out.

Mr. A. W. BOURNE (London) said that the collection of this enormous amount of statistical material had been valuable in consolidating ideas of certain clinical and ætiological facts, but the causation of the disease was as obscure now as 20 or more years ago. He supported the suggestion that there should be some unity of treatment, and felt that the excellent results from Dublin were not due so much to the precise method of treatment indulged in, which, after all, was largely based on an unproved theory, as to the fact that there was uniform treatment throughout. Until they got some unity of treatment they could neither compare results nor make much further progress. The committee system which had been adopted for research on this matter was immensely more valuable than research work carried on by one individual.

Dr. GIBBON FITZGIBBON (Master of the Rotunda Hospital, Dublin) read a paper on

The Relationship of Eclampsia to the Other Toxæmias of Pregnancy.

The paper was based on a study of 40 toxæmic albuminuric cases, 16 eclamptic cases, and 4 toxæmic ante-partum hæmorrhage cases. From a consideration of tables showing the degree of the principal symptoms, the age of the patients, the period of pregnancy, and the condition of the fœtus in primiparæ and multiparæ, Dr. FitzGibbon had drawn the following conclusions:—

1. Primiparæ are more liable to toxæmia than multiparæ, but the age of the primipara has no influence on its development.

2. When a primipara becomes toxæmic, the tendency to develop eclampsia is in proportion to her youth.

3. The development of eclampsia in toxæmic women does not appear to be influenced by the pregnancy being primiparous or multiparous. If anything the multipara is more likely to develop eclampsia.

4. The period of pregnancy at which serious toxæmic symptoms or eclampsia develop is undoubtedly greatly affected by multiparity. It is relatively early in multiparæ and late in primiparæ. The longer the pregnancy continues, the greater is the tendency to eclampsia.

The treatment adopted in the Rotunda Hospital consisted of elimination, and was based upon the belief that the toxin was the result of metabolic processes which were not abnormal to the pregnancy, but which accumulated owing to faults in management or deficient reserve power of the excretory organs and then produced toxic effects. There was practically no difference in the treatment of any of the toxæmic states beyond that called for by the immediate urgency of a symptom or the condition of the patient, and any alteration was subsidiary to the main treatment. The patient was kept in bed, free purgation was adopted and assisted by enemata. She was induced to drink as much water as possible, at least six pints in 24 hours but preferably more. If the secretion of urine rose to normal and the albumin became moderate milk was tried, and by the subsequent course of the case it was decided whether the pregnancy could be carried on or not. If there was vomiting enemata were persisted with, and in 24 to 48 hours purgatives by the mouth were retained. When the vomiting ceased the treatment was the same as for toxæmia. In eclampsia the variation in treatment was due to the coma. The patient was kept on her side and nothing given by the mouth except by tube. The stomach was washed out and a purgative introduced with 12 oz. of sodium bicarbonate solution. The colon was washed out, not by means of a long rectal enema, but the tube was actually passed into the colon with the aid of a finger in the rectum. This part of the operation was difficult and took 20 to 30 minutes to effect. The colon washing took altogether from one to one and a half hours and 8 to 12 gallons of fluid. Colon lavage might be required one to three times at five-hour intervals, depending upon the degree of coma and the result of the purgatives. Other treatment was dependent on symptoms and persistence of coma. Morphia used to be given in the majority of cases but was now excluded as likely to cause respiratory complications and delay excretion, while it did not control the fits. Dr. FitzGibbon pointed out that this treatment and that of Strogonoff, which was based upon the same principles, were the only methods showing a mortality under 10 per cent.

A paper on the Treatment of Eclampsia by Veratrone (25 cases) by Mr. T. G. STEVENS was read by Mr. A. W. Bourne and Mr. BOURNE read a paper on A Case of Eclampsia Treated by Veratrone.

Dr. W. S. A. GRIFFITH asked Dr. Eden to explain what was meant by deaths from eclampsia. Were they all agreed as to what was meant by the term "eclampsia"? Were not convulsions merely one phenomenon of a general disease, which was more widespread and not confined to the appearance of convulsions? In Dr. FitzGibbon's communication toxæmic cases were included but these were not strictly eclampsia.

Dr. EDEN, replying to the previous speaker, said that in the report read by him deaths attributable to eclampsia referred to those so diagnosed clinically; they did not rest upon any post-mortem examination. It had been said that nothing new had emerged from the reports read, but at least there was now a certain amount of unanimity of opinion that active interference was to be deprecated. The results of Cæsarean section were certainly not good. The most striking communication the Congress had received was that from Dublin. He was not prepared to accept Dr. Hastings Tweedy's theory, but that did not detract from his admiration of the results which had followed from the treatment used. Dr. Eden hoped that the inquiry would be continued; a series of suggestions had been drawn up asking societies to join in a technical inquiry into the results of treatment.

Dr. BETHEL SOLOMONS hoped that the Tweedy treatment would be given a thorough trial on this side of the water. In reply to Dr. HERBERT SPENCER, he said there were no patients with eclampsia without fits in his series of 204 cases. He did not believe there was much future in drugs such as veratrone and pilocarpine.

Dr. FITZGIBBON said he considered that toxæmia was the disease and eclampsia one possible symptom of it; eclampsia should not be treated separately. He thought that in Ireland they had proportionately a smaller number of eclampsia cases, and that this was due to the fact that the disease occurred chiefly among the well-to-do artisan class. He insisted on the most careful observation of eclamptic patients and referred to the grave risks of suffocation, which was more likely to occur if patients were kept in a darkened room.

Pathological Meeting.

A pathological session was held in the Medical Institution on July 1st, the chair being taken by Dr. Bethel Solomons, when Prof. Blair Bell (Liverpool) read a communication on Endometriomata of the Ovary and Dr. R. A. Hendry (Liverpool) described a method of preparing the bony pelvis for the museum. Specimens were shown as follows:—Dr. Fletcher Shaw (Manchester) and Dr. Addis: Adenomyomata of the rectogenital space associated with tarry cysts arising in islands of adenomyomatous tissue in the ovaries. Dr. Lamond Lackie (Edinburgh): (*a*) Uterus containing placental tissue retained for 19 months; (*b*) Chorionepithelioma occurring in a tubal mole. Dr. J. E. Gemmell and Dr. Hendry (Liverpool): Double uterus, vagina, and vulva. Mr. H. Reid (Liverpool): Secondary carcinoma of the ovary associated with four months' pregnancy. Miss Frances Ivens: (*a*) Sections from a fatal case of post-partum eclampsia; (*b*) Specimens illustrating necrobiotic changes in fibroids associated with pregnancy. Dr. Hendry: Dermoid cyst of vulva. Prof. Blair Bell: Tubal mole removed by incision of Fallopian tube which was subsequently sutured. Dr. Gemmell: Omental tumour, probably sarcoma.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

DUBLIN DURING THE FIGHTING.

FROM June 28th to July 5th Dublin was the scene of incessant fighting. For the first two and a half days the struggle concentrated round the Four Courts; for two days more it was scattered round various "outposts" on the south side of the city; and for the last three days it was concentrated on the northern end of O'Connell (or Sackville) Street. The total casualties, up to Friday night, July 7th, are said to be 61 killed and 274 wounded. Of this total the Irish Army lost 16 killed and 122 wounded. The Irish Army seems to have been fairly well equipped with medical personnel, but for hospital work it relied almost entirely on the ordinary civil hospitals, where the best surgical skill was available. The three hospitals north of the river had most of the work thrust upon them. Jervis-street Hospital received 24 dead and 54 wounded. The Richmond Hospital received 11 dead and 57 wounded, and the Mater Misericordiæ Hospital received 12 dead and 56 wounded. Of the hospitals south of the river, Mercer's received 4 dead and 18 wounded, whereas smaller numbers were sent to the more distant hospitals. At no time was the hospital accommodation exhausted, and the surgical staff were able to deal with all cases expeditiously. One medical man was wounded through the head while answering a call for surgical assistance in the Irregular quarters in Sackville-street.

The Irish Army had a fair supply of ambulances and Red Cross workers, but the main work of ambulance transport was undertaken by the St. John Ambulance Brigade, which was mobilised by the Commissioner, Sir John Lumsden, immediately fighting had begun, and the members worked incessantly until after the last shot had been fired. Ambulance posts were established close to the points of greatest danger; the Brigade members rendered first-aid to the wounded wherever they fell, and removed them even under the hottest fire with coolness and courage. Many of the ambulances were driven by women. Both sides appear to have shown the respect due to the Red Cross, though one ambulance driver of the Irish Army was accidentally killed by a bullet. Unfortunately, abuse of Red Cross privileges occurred in other ways. Early in the fighting one of the leaders of the Irregulars was discovered in the dress of a nurse attempting to pass the military lines to gain access to his men in the Four Courts. Several cases of commandeering of goods by men and women travelling under the Red Cross flag have also been reported.

The civilian life of the city went on with much less interruption than might have been expected. Though postal and telegraph services were suspended medical telephone calls got through. Newspapers appeared regularly and frequently, and the shouts of the itinerant newsboys sometimes almost hid the rattle of rifles. Bread and milk were delivered with almost routine regularity, even in the danger zones, and most of the necessary supply shops were open at intervals. The people were allowed to move about with much freedom, and the crowds of spectators not infrequently hampered the national troops right up to the firing line. It was mainly to this lack of caution that the high incidence of casualties among civilians was due.

Comparing the present situation with the Rebellion of Easter week, 1916, the number concerned in the recent fighting was probably only about one-tenth of the number in the Rebellion. This is due partly to the fact that the insurgents in 1916 acted on the offensive, while the Irregulars in 1922 were on the defensive all the time. The fighting, has, therefore, been more limited in area. Again, the soldiers of the Irish Army last week knew their ground and were able to take more care in protecting the civil population. The supply of food and necessaries has been carried on with less interruption than in 1916.

AUSTRALIA.

(FROM OUR OWN CORRESPONDENT.)

Bubonic Plague in Queensland.

FOR the past two months Queensland has kept free from plague in human beings, but recently a case has been reported from Innisfail. A few plague rats continue to be found in Brisbane. In Sydney 34 or 35 cases have occurred, of which eight have been fatal. Plague rats continue to exist in the city area. A remarkable case of infection occurred at a private school in Parramatta, where a girl, aged 13, died after two days' illness and before her condition was definitely recognised as plague, though it was suspected. There was no plague in Parramatta, which is some 20 miles from the city, and no infected rats had been discovered there. The child had been at a seaside resort before coming to school, and this place was also without suspicion of plague. The only source of infection seemed to be in a visit paid to the city where an hour was spent in a certain drapery establishment which at the time was clean, but afterwards supplied a case of plague. This visit occurred 12 days before the girl became ill, but in spite of this, Dr. Armstrong, the chief health officer, inclines to the view that she was infected on this visit, or that a plague flea was acquired which did not bite till some later date. The treatment adopted in Sydney is liberal doses of anti-plague serum prepared at the Government Bureau of Microbiology. The other States have remained free of infection. All inter-State shipping is inspected, but passenger traffic by rail is not dealt with.

Hospital Finance.

The reintroduction of a Bill for the control of charitable institutions is announced. The main feature of a measure introduced last year, but withdrawn, was the appointment of a committee to allocate the government grants, to close unnecessary institutions or amalgamate them in some instances, and to equip and maintain intermediate hospitals. The drafting of the Act left this latter power entirely in the discretion of the Minister and was the chief point of objection from the medical profession. The new measure is based upon somewhat similar lines. The establishment of intermediate hospitals is quite impossible without the concurrence of the profession. Medical men object to any institutions which shall provide medical treatment at a fixed and inclusive rate, in the management of which the medical profession has not adequate representation.

Vaccination in Victoria.

Dr. Robertson, chairman of the Board of Health in Victoria, states that of 35,493 children born in Victoria during 1921, only about 4000 have been vaccinated. Until a few years ago Victoria had the best vaccinated population of any Australian State. Recently a clause was enacted admitting conscientious objection, imitating the English Act; this seems to have been very generally taken advantage of as an escape from the compulsory requirement. Dr. Robertson expresses the view that people have not lost faith in vaccination, but are content to postpone it till the disease appears, and he points out the dangers of such a delay. Numerous cases apparently occurred in the two last winters which were regarded as chicken-pox, but were in some not free from suspicion of being mild small-pox.

British Medical Association Congress.

The first Australian Congress of the branches of the British Medical Association will be held from Nov. 12th to 17th, 1923.

MEDICINE AND THE LAW.

The Case of Gaster v. *Hirsch.*

THERE are two ways which lead to that high plateau which the public insists should be known as the Harley-street area. Appointment to the staff of an important hospital corresponds to a funicular railway which transports a young man swiftly to a level where he may or may not succeed in living with comfort. There is another path, however, whereby pedestrian ascent may be made. Those whose success has been practical rather than academic, who have gained such esteem from their colleagues in general practice as frequently to be called into consultation by them, often feel that their wide experience and known skill in dealing with puzzling cases justify them in placing these gifts at the disposal of a larger public. Some of our wisest consultants have arisen in this way, and in the branch of consulting medicine especially the experience of many years in general practice is valuable. It is not to be expected, however, that these men will reject as patients those families to whom they have acted as house-doctor for many years.

In a recent case before Mr. Justice McCardie, Dr. Anghel Gaster sued Mr. Leopold Hirsch to recover £131 5*s.* alleged to be due as fees for professional attendance. The account was based on a fee of two guineas a visit, and included 15 guineas for attendance at an operation for which the surgeon's fee had been 150 guineas. The defendant pleaded that in the terms of a verbal contract he was to be charged two guineas for the first visit and one guinea for subsequent visits, and alternatively, that the fees claimed were not fair and reasonable. The case turned chiefly on whether a consulting physician, when employed in the capacity of family practitioner—as when present at an operation—should charge fees appropriate to a consultant or to a practitioner. Mr. Justice McCardie decided that the plaintiff was not a consulting physician in the strictest sense—that is, one who acts only in conjunction with, or upon the introduction of, a family doctor, but that he might be described as a physician who combined the diagnostic and advisory work of a consulting physician with that of a general physician, one who frequently visited the houses of patients in much the same capacity as a general practitioner, charging the same rate of fees. Judgment was given for 93 guineas as a just and proper remuneration for the services rendered; in the opinion of the judge, the charge of 15 guineas for attending an operation was too high, also that of eight guineas for four visits on the same day. On the other hand, he did not regard as excessive a fee of three guineas for each of two consultations.

It is obvious that no absolute distinction can be made between a consultant and a practitioner, for practically every medical man has at one time or another been called upon to act in either capacity. It would be open to any would-be consultant to announce that he will only visit those of his old patients who are content to pay for his services at consulting rates; but this would not necessarily help matters, for consulting fees are not immune from a sliding scale. This scale was mentioned by Sir Thomas Horder when giving evidence in this dispute. It is usually assumed that the scale is one of reductions from a certain maximum deemed appropriate for the well-to-do middle or upper-class patient, but there is no law to prevent any specialist from rating his own services high and charging proportionately. Payers of super-tax should not, of course, be unduly victimised in order that poor patients may pay less; the former should not be compelled to vicarious charity. A paradoxical point may be made, because it is none the less a real one. It may sometimes be expedient in the patient's own interest to demand a high fee, for, in a commercial world, confidence is enhanced by high payment. It is customary among consultants to discuss the fee payable in any individual case with the family doctor. If the latter, knowing the circumstances or the temperament of the patient, advises a higher fee than is usually charged and has already prepared the patient for such a higher fee, a lower charge might well embarrass the consultant and destroy the confidence of his patient. A certain class of patient nearly always asks for "the best man in London," and feels that in obtaining expensive services he has taken precautions due to himself.

Essentially the lesson of the Gaster *v.* Hirsch case is the unwisdom of doubling the part of consultant and family doctor to any one patient at the same time. To avoid misunderstandings the protection afforded to both patient and doctor by the second opinion is well worth paying for.

Gaul v. *Earl Spencer and Others.*

In an action in the King's Bench Division before Mr. Justice Darling and a special jury, Miss Lilian J. Gaul sued the committee of St. Andrew's Hospital for Mental Diseases, Northampton, and Dr. D. F. Rambaut, the medical superintendent. The plaintiff alleged that she entered St. Andrew's Hospital in April, 1917, under a voluntary agreement to undergo a rest cure and treatment, but that later she was detained under a magistrate's order. She made various complaints of her treatment in the institution, and in particular of deprivation of liberty during the early part of her residence, when she was a voluntary boarder. The defendants denied the allegations; they relied upon the protection afforded by the Lunacy Act, 1890, denied that there was a contract between them and the plaintiff, and said that they had acted in good faith and with reasonable care. After four days' hearing, in which the plaintiff conducted her case in person, Mr. Justice Darling summing up, said that nine-tenths of the observations of the plaintiff had been beside the mark. She was not entitled to damages for what was done under the order made by a justice of the peace. The question to determine was whether her treatment had been proper or improper. She had recovered. She was a highly gifted woman, but with an obsession which had led her to make the charges she had brought forward. The same rules did not apply with regard to the liberty of a person who was ill as in the case of a person who was well. There was a liberty which was consistent with wise restraint. If the plaintiff's liberty was restrained in accordance with what her condition required, she was not entitled to damages for what was done. After an absence of an hour the jury returned a verdict for the defendants, for whom judgment was entered with costs.

An Unexplained Death.

At a recent inquest held by Mr. Ingleby Oddie at Westminster upon the body of Mr. J. S. Saltus, an American, the coroner returned a verdict of "Death from Misadventure," admitting in doing so that he had to guide himself by evidence as to what might have occurred, and by the absence of any that pointed in an opposite direction. The deceased was a collector of coins, recently elected president of the British Numismatic Society. He had bought 100 grains of cyanide of potassium from a druggist who had before supplied him similarly, and who believed that the drug was used for the purpose of cleaning old silver coins. Mr. G. R. Francis, acting president of the Numismatic Society, deposed that cyanide was used for cleaning coins, but that he had himself never employed it for the purpose. In Mr. Saltus's bedroom, in which he was found dead, were a tumbler containing ginger-beer which he had ordered during the evening, and another tumbler containing a solution of cyanide of potassium. There were old coins in two bags in a trunk in the room, but none on the table where the tumblers were found. There was no evidence of any cause for anxiety or worry on the part of the deceased. Dr. H. B. Weir, as a result of post-mortem examination, said that death was apparently due to cyanide poisoning; there was a trace of the drug in the stomach and the deceased had a weak heart. Mr. Ingleby Oddie accepted the suggestion that the deceased drank from the glass containing cyanide by mistake for that containing ginger-beer.

Correspondence.

"Audi alteram partem."

THE OFFICIAL SPIRIT IN MEDICINE.

To the Editor of THE LANCET.

SIR,—It is, I feel sure, with many others, that I have read with pleasure your leading article in THE LANCET of July 8th under the above title. To those of us who have not bowed the knee to the Baal of official medicine, your journal has for some time appeared rather as the apologist for State medicine than as the advocate of the individualistic spirit which you correctly remark is the "key-note of medicine" and which you believe "it will remain." With many others, also, I share that belief, and that it will lead to the reconstitution of an individualistic profession that will imply its regained freedom. The mechanism for this devoutly to be desired consummation I shall not deal with now, but it has not been unconsidered. The event itself will not be hindered by the incontestable fact that the genuflexions of those who have fallen down before the official Baal are as sensitive as a barometer and exhibit a varying obtuseness or acuteness of knee-angle in proportion to the fall or rise of the capitation grant! The leg of the worshipper has never been steadily straight since the addition of medical benefit to the National Insurance Act, nor has it been completely bent; and this notwithstanding the overt adulation of the chief medical officer of the Ministry of Health, of the general practitioner, on every possible occasion, as he quite correctly perceives that that large section of the profession must be his principal recruiting ground for personnel to work the Act. One cannot forget the stampede of the 10,000, who are almost as historical as the classical 10,000 of Xenophon. We have, however, only to remember the consternation recently caused by the possibility of a return of friendly society control, due to the longing eyes cast by the Minister of Health at their accumulated funds, to recognise how sensitive a plant semi-nationalised medicine is.

Sir John Tweedy's and Sir Clifford Allbutt's remarks to which you refer have a wider application than to the tuberculous detail with which you deal in your last issue. The latter and his colleague are quite correct in their appreciation of the fact that official action has split the profession from top to bottom, and that the "two camps" will neither combine nor coöperate until an independent profession again arises, freed from official shackles and shekels. May we hope that THE LANCET, with memories of its great service to medicine, and so cognisant of its beneficial individualism, will aid the profession of Harvey, Jenner, and a host of other individualistic votaries of Asclepios to rear again a temple in which sounds of discord will be hushed and an atmosphere of peace prevail with benefit to the pockets of the taxpayer and the health of the public, and to the greater glory of medicine?

I am, Sir, yours faithfully,

ALEXANDER BLACKHALL-MORISON.

Upper Berkeley-street, W., July 8th, 1922.

RENAL GLYCOSURIA OR NEGLIGIBLE GLYCOSURIA.

To the Editor of THE LANCET.

SIR,—Dr. O. Leyton (THE LANCET, July 8th, p. 99) has introduced the new name of "negligible glycosuria" for the condition which has hitherto been known as renal glycosuria, renal diabetes, or diabetes innocens. The name diabetes innocens which I, following Salomons, used until lately, is a bad term, and I fully agree with Dr. Leyton's criticisms of it. Renal diabetes is also a bad term for the same reasons. Dr. Leyton also objects to the term renal glycosuria on the grounds that it cannot be proved that it is the kidney which is at fault, but that it may be due to a change in the salts of the blood. But as this change in the blood salts is responsible for the alteration of the threshold of the kidney, and so allows sugar to escape at a threshold below the usual threshold of the kidney—i.e., 0·17–0·19 g. per cent.—it does not seem inappropriate to continue the use of the name renal glycosuria. This term, moreover, is used by nearly all the numerous workers on this subject. The use of the vague term negligible glycosuria permits Dr. Leyton to include in this group cases which may suffer from a very mild form of diabetes; this does not seem to be of any real advantage, and it is better to maintain a more rigid classification.

Dr. Leyton has asked for a diagnosis in one of his cases, but it is not possible to give this until he supplies the necessary data. It is not sufficient to take the blood sugar even at frequent intervals after a "generous tea." It should be taken according to the usual method of giving either a dose of 50 g. of sugar or a definite dose of carbohydrate. Further, the total amount of sugar excreted per 24 hours should be estimated after: (1) a fast day, (2) a carbohydrate-free diet, (3) the addition of 4, 8, and 16 oz. of bread. This procedure may seem somewhat long to Dr. Leyton, but I believe that it is necessary in order to make certain whether the patient has renal glycosuria or a mild form of diabetes. No greater mistake can be made than to treat a mild case of diabetes as one of renal glycosuria. Dr. Leyton also differs from me in the height to which the blood sugar may rise in health. As my own blood sugar rises to 0·17–0·19 g. per cent. after a 50 g. dose of sugar, and has done so since 1914, without my developing diabetes mellitus, I am prepared to allow that this may also occur in other healthy persons. If glycosuria occurs under these conditions it is necessary to repeat the test with a 25 g. dose of sugar, so as to see at what level glycosuria does occur.

I quite agree with Dr. Leyton that it is possible that diabetes may develop in a patient who has a low threshold of sugar, and this makes it all the more necessary to make the diagnosis only after sufficient and careful testing.

I am, Sir, yours faithfully,

GEORGE GRAHAM.

Devonshire-place, W., July 10th, 1922.

NEGLIGIBLE GLYCOSURIA.

To the Editor of THE LANCET.

SIR,—It is evident from Dr. O. Leyton's letter in your issue of July 8th that his conception of diabetes and mine differ widely. He appears to divide his cases into two groups: (1) negligible glycosuria, (2) diabetes mellitus. I regard glycosuria, or diabetes, as a condition arising from a variety of causes, in much the same way as fever may result from the action of different causative agents, and I believe that unless these causes are accurately differentiated a reliable prognosis is impossible and the treatment is necessarily empirical. This view is based upon the results of the investigations Mr. H. A. H. Howard and I have been carrying out during the past ten or twelve years, which have been confirmed by the animal experiments Mr. Cairns Forsyth has conducted for us recently. We hope to publish a full account of our joint work in the near future. I may say, however, that we have found it possible by the use of "elaborate methods," such as Dr. Leyton deprecates, to differentiate a number of types of glycosuria, or diabetes, which differ in their origin, course, and prognosis, and that this knowledge has enabled us to modify our treatment accordingly. Although such methods of differential diagnosis are helpful in all cases of diabetes, it is in the early and doubtful cases that they are particularly useful, since they then enable one to correct errors of metabolism at their commencement, when they are most susceptible of successful treatment.

I consider that Dr. Leyton's negligible glycosuria is neither a clinical nor a pathological entity, but only a loose subdivision which embraces more than one type of case, and that is why it "does not protect from diabetes mellitus." Dr. Leyton takes me to task for appearing to ignore this statement, but I hoped I had made it quite clear that, in my opinion, negligible glycosuria, if it is truly negligible, never turns into diabetes, and if it does it is the diagnosis that is at fault. He further says it is only when there is "conclusive evidence" that a case of glycosuria should be considered as negligible. Now, according to his previous letter, "the essential character of negligible glycosuria is the very low renal threshold for dextrose," and I took it therefore that the conclusive evidence he requires is obtained by estimating the sugar content of the blood. This, however, even when taken in conjunction with the absence of clinical symptoms of diabetes, is not in my experience by any means a certain guide to prognosis or an indication that treatment is unnecessary.

In the last paragraph of his letter Dr. Leyton asks me a specific question, and I can best reply to it by quoting the case of a boy of 17, who was sent to me in 1919 because he was accidentally found to be passing sugar in his urine. On a mixed diet, containing oatmeal, toast, and potato, he excreted 5·5 grammes (0·5 per cent.), of sugar, but his blood sugar never exceeded 0·12 per cent., which is well below the 0·15 per cent. demanded by Dr. Leyton. At that time I was much in the same position as Dr. Leyton appears to be now, and, regarding it as a case of "renal" (or negligible) glycosuria, I suggested that the patient should continue on a mixed diet, merely avoiding sugar and substances containing sugar, as a precautionary measure. A year later I saw him again, and then found that, on a similar diet, he passed 18 grammes (2·0 per cent.) of sugar and that his blood sugar ranged from 0·10 per cent. fasting to 0·20 per cent. three hours after a meal, while further investigation of his blood showed evidence of considerable deficiency of the internal secretion of the pancreas and other changes typical of early diabetes. With appropriate treatment the pancreatic disturbance subsided, the hyperglycæmia was quickly controlled, and he was eventually able to take a fairly reasonable diet with a blood sugar varying from 0·05 per cent. to 0·16 per cent. It might, of course, be contended that this was an example of diabetes developing in an individual who originally had negligible glycosuria, but to me it seemed to be a mistake in my first diagnosis, and at any rate it taught me not to rely upon the clinical symptoms and blood sugar estimations alone when considering the need for treatment in a case of apparent "negligible glycosuria."

I am, Sir, yours faithfully,
P. J. CAMMIDGE.

Nottingham-place, W., July 10th, 1922.

MALIGNANT DISEASE AND LEUKÆMIA.

To the Editor of THE LANCET.

SIR,—In the interesting and fair review of my recent investigations on the above subject in your issue of July 8th (p. 86) you raise some points of the greatest importance.

The crucial test of the value of my experimental results, as you indicate, turns on the relationship between the lymphoid hyperplasia which I have produced in well over 100 mice and ordinary malignant growths. As you infer, the lesion which I have succeeded in inducing has some analogy to the infective sarcoma of Rous. This relationship may be interpreted in one or other of two possible ways. On the one hand, the lymphoid hyperplasias, lymphosarcoma, and the closely related leukæmic phenomena may be removed from the category of the neoplasms. The strongest reason for this view is the manifest infective characters which these conditions, as opposed to ordinary malignancy, exhibit. On the other hand, these related conditions may be embraced within the category of the neoplasms, when at once we must admit by analogy the strong implication of an infective origin of malignant new growths. A very careful consideration of the whole subject in its various aspects has convinced me that this view is in consonance with the ascertained facts, and it is a view which finds repeated expression in the literature. A refusal to bring it within the scope of cancer research carries with it a risk of blocking an avenue full of extreme suggestiveness.

The main considerations in support of the view that I commend are:—

1. For the first time, so far as I know, a chronic lymphoid hyperplasia often indistinguishable from lympho-sarcoma has been produced experimentally by the exhibition of an organism which has been isolated and cultured.

2. This organism was obtained from definitely malignant growths and leukæmia. A moment's contemplation must satisfy us that (1) and (2) are bound together by a definite scientific correlation, or they are dependent upon an almost inconceivable series of coincidence.

3. As I have shown, this organism can be seen in the incubated malignant tumour to originate, in part at least, by the germination of round or oval bodies which have characters that suggest a blastomycete.

4. In the lymphoid lesions of mice experimentally infected with the bacillary phase of the organism I have studied the development from the smaller phase of larger bodies which are indistinguishable from those present in carcinoma. This observation, which followed in natural sequence from the preceding investigations, has, I believe, been made with a completeness which allows of no dubiety. If substantiated it must be held to provide very strong proof of the validity of the research.

The bacillary phase of the organism belongs to the coli-typhoid group, and I believe on grounds which I cannot fully substantiate here that malignant growths and the associated chronic lymphoid and leukæmic phenomena are dependent upon a chronic infection of cells by an organism which, under other conditions, is capable of producing acute infective phenomena.

In view of my results it is interesting to hark back to the early work of Mallory, who, in a description of the histology of the typhoid process in 1898, described it as essentially proliferative in nature. In addition he made the suggestive statement that in it there is a proliferation of "cells which acquire for a certain length of time malignant properties." Even in the acute phase of infection (and I have made the same discovery with the closely allied organism which I have employed for experiment) there may be a true malignant manifestation. If my views are correct the related lymphomatous, lymphosarcomatous and leukæmic phenomena, on the one hand, and ordinary malignant tumours on the other hand, are all bound to one another on ætiological grounds, and they present the extensive range of tissue response which the causal organisms are capable of eliciting under varying conditions of infection.

I am, Sir, yours faithfully,
Edinburgh, July 8th, 1922. JAMES YOUNG.

THE THERAPEUTIC ADMINISTRATION OF GASES.

To the Editor of THE LANCET.

SIR,—The annotation in THE LANCET of July 1st with this heading undoubtedly draws attention to an important matter—namely, that though oxygen is provided in most nursing homes, it is not unknown for the fine adjustment valve to be coarse and erratic in action, and, as you remark, it may at first refuse to turn and when it does may blow off the rubber connexions, &c. With a warmed ether or gas oxygen apparatus this behaviour may spoil what would otherwise be an ideal anæsthesia.

The cause is that in most fine adjustment valves the seating is made of brass or gun-metal. Steel is unsuitable on account of the action of oxygen on that substance. In consequence of use, the seating and cone become pitted; thus the difficulty in turning on and frequent impossibility of regulating the flow of gas. I have seen a good many valves scraped for this defect; thus this letter to suggest that grinding in the seat, as is done with motor valves, will effect a complete cure. All that is needed is a steel tool turned up to the correct cone and a little carborundum powder. Messrs. Bradby, of Canning-place Mews, made me a tool which I found most efficacious.

I am, Sir, yours faithfully,

CHARLES T. W. HIRSCH,
Anæsthetist, Samaritan and other Hospitals.

July 4th, 1922.

CRITICAL REVIEWS OF TROPICAL DISEASES.

To the Editor of THE LANCET.

SIR,—I have seen with interest the note in THE LANCET of July 8th (p. 76) on the *Tropical Diseases Bulletin* for May 1922. The critical review by Colonel A. Alcock on medical zoology to which your note refers is one of a series of such critical reviews which are now appearing regularly in the *Bulletin*. Others of the series are:—

	Vol.	No.
Alcock: Recent Progress in Medical Zoology, Part 1	18	1
Tull Walsh: Recent Advances in the Knowledge of Cholera	,,	2
Warrington Yorke: Recent Work on the Treatment of Sleeping Sickness	,,	3
Manson-Bahr: Dysentery: A Review of the Literature of the Last Six Years	,,	4 & 5
Bassett-Smith: Beri-beri: A Critical Review	,,	5
Wenyon: Leishmaniasis: A Review of Recent Literature	19	1 & 2
Wenyon: On Three Supposed New Entamœbæ of Man	,,	1
Clayton Lane: Malaria: A Critical Review	,,	2
S. Lyle Cummins: Tuberculosis in the Tropics: A Review of Recent Work	,,	3
Leiper: Medical Helminthology, Part 1	,,	5
A. D. Bigland: Pellagra: A Critical Review of the Literature since 1914 (in the press)	,,	6

One of the main objects of these critical reviews is to help to focus attention on the more interesting and important work on the subjects under reference, and thus to act as finger-posts for the workers in tropical medicine to those papers of greater significance among the many which are summarised in the body of the *Bulletin*. Incidentally it may be of interest to you to know that the Tropical Diseases Bureau has just completed its tenth year of existence.

I am, Sir, yours faithfully,

R. C. SHEPPARD,
Secretary and Librarian, Tropical Diseases Bureau.

23, Endsleigh-gardens, London, N.W.1, July 7th, 1922.

COMPLEMENT FIXATION IN GONORRHŒA.

To the Editor of THE LANCET.

SIR,—Dr. A. H. Priestley's letter in THE LANCET of July 1st is extremely interesting. He raises one or two points which I should like to comment on.

1. As regards very early positive results in complement deviation in gonorrhœa, I must confess that in my experience they are few and far between; moreover, it is always extremely difficult to exclude a previous attack, and histories are often not of much value.

2. As regards "false positives," I still find them rare. In this clinic frequent bacteriological examinations are made in all doubtful cases, and sooner or later gonococci are found in most positive cases. I gather that Dr. Priestley uses a dilution of 1 in 5 patient's serum when putting up his tests; I use 1 in 9, because I noticed a tendency to false positives when using the lower dilution. Perhaps this may explain the discrepancy. Of my three positives in non-gonorrhœal cases (reported in THE LANCET of June 10th), one was ++ 3 weeks later, one ++ 4½ months later, and one I lost sight of. Of my nine "possibles"—i.e., cases which showed few, if any, clinical signs and gave a positive test, six had no further test done.

One was ±± 9 months later.
One was ±± 3 weeks later.
One was neg. 5½ months later.
One was neg. 7½ months later.
One was ± 6 weeks later.
One was ± 3 months later.

3. As regards the persistence of positive reactions after cure, the great difficulty seems to be to know when a case *is* cured—especially a female. The fact that, in my experience, positive reactions often do persist may be due to the fact that vaccines are largely used in this clinic and in considerable doses.

4. I have certainly had similar cases to those quoted by Dr. Priestley which give variable results when repeatedly tested, but I do not think they are very common. Dr. Priestley's explanation seems a plausible one.

5. There seems no doubt that a positive complement-deviation test in a suspected case of gonorrhœa is very valuable, and one hopes that more general use will be made of this test; on the other hand, a negative test is by no means of equal value.

I am, Sir, yours faithfully,

T. E. OSMOND.

St. Thomas's Hospital, S.E., July 7th, 1922.

"TENNIS ELBOW."

To the Editor of THE LANCET.

SIR,—I was interested in Dr. F. Romer's paper on this subject published in THE LANCET of July 8th. I think I may say that there is still another form which this trouble may take. In my case at least the site was different, and I believe my explanation of the pathology to be correct in this instance. The condition appeared to be one of mild bursitis of the bursa underlying the insertion of the triceps muscle, leading to tenderness on direct pressure and pain on extending the forearm against resistance. The inconvenience was considerable whilst playing tennis, but on playing golf, while the condition was still present, no disability was appreciable.

I am, Sir, yours faithfully,

Dundee, July 10th, 1922. A. E. CHISHOLM.

Obituary.

J. C. OGILVIE WILL, M.D., C.M. ABERD., F.R.S.E.

THE death took place at Aberdeen on June 29th of Dr. J. C. Ogilvie Will, one of the most prominent medical practitioners in the city. Dr. Will qualified M.B., C.M. Aberd. in 1866, becoming M.D. in 1868. For a considerable time he assisted the late Sir James Y. Simpson in Edinburgh, and then returned to Aberdeen as assistant to the late Prof. Pirie, later becoming assistant professor and examiner in surgery at the University of Aberdeen. In 1874 he was elected surgeon to the Aberdeen Royal Infirmary, an appointment which he held for 15 years, and resigned only because the large increase in his private practice compelled him to curtail some of his activities. He was then appointed consulting surgeon. Dr. Will was a medical referee under the Workmen's Compensation Act, and for many years held the post of medical officer of Craiginches Prison, Aberdeen. Though 77 at the time of his death, Dr. Will carried on a large practice till a few weeks ago. He was interested especially in diseases of the genito-urinary system, and published various articles from time to time in the medical journals, chiefly in this branch of surgery.

Dr. Will was a successful clinical teacher, and his genial nature and his general ability made him a most popular practitioner. He had a large panel practice and was especially popular with his poorer patients. He retained his carriage and pair to the end, and was a familiar figure on his morning rounds. Dr. Will was keenly interested in the Scottish Episcopal Church. For nearly 50 years he had been senior trustee of St. Andrew's Cathedral, and he was lay elector of the cathedral for appointments to the bishopric. Dr. Will is survived by his wife, two daughters, and a son.

ARTHUR NATHANIEL DAVIS, L.R.C.P., L.R.C.S. EDIN., L.M.,

MEDICAL SUPERINTENDENT, DEVON MENTAL HOSPITAL, EXMINSTER; MAJOR, R.A.M.C. (T.).

Dr. Arthur Nathaniel Davis, who died suddenly at Exmouth on June 29th, was born in 1857, and became L.R.C.P., L.R.C.S. Edin. and L.M. in 1880. He began his 42 years' service in mental hospitals at Bethnall House Asylum, London, and from here went to the Portsmouth Borough Asylum. In 1883 he took up a colonial appointment in Antigua. His health, however, was affected by the climate, and he returned to England a year later, obtaining the appointment of medical officer in charge of an annexe to the Dorset County Asylum. He then held for seven years the post of medical superintendent of the Plymouth Borough Asylum, leaving in 1898 to become medical superintendent of the Devon Mental Hospital at Exminster. During his 24 years' tenure of this post he gained the complete confidence of the county, and was frequently consulted by other authorities.

When the war came he was faced with peculiar difficulties, as his senior and second assistant medical officers were immediately mobilised. Not only did he successfully carry on the administration of his large hospital, but he also took an active part in recruiting, and was given the rank of major in the R.A.M.C. Apparently he over-taxed his powers; in the winter of 1915 he had a serious illness, but seemed to make a satisfactory recovery, and devoted great energy to provide Exminster with a recreation hall. His name figures on one of the foundation-stones of this building, and will be a lasting memento of his connexion with the hospital and village.

Some twelve months ago, through a fall, he sustained a severe injury to his hip, and was unable thereafter to carry out his full duties. At Christmas, 1921, he intimated his intention of resigning, but he was induced to continue in office for a further period. Eventually it was decided to accept his resignation, which was to have taken effect from June 30th, 1922, on which day he was to have been presented with a farewell gift from the staff. He was at the hospital on the 29th, and appeared to be in his usual health and spirits. He motored to Exmouth in the evening, and shortly after he had retired to rest at his residence he complained of pain and collapsed, death taking place almost immediately. The staff of the hospital, of which he was head for so long, held him in highest esteem, and his loss is felt by all.

Dr. Davis was an all-round sportsman of no small ability. He was an excellent shot, and his name has been well known for many years in the county of Devon as a cricketer. In 1883 he married Florence, daughter of the late General George Warren, who survives him.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Comdrs. T. T. Jeans and H. S. Burniston to be Surg.-Capts.

The following appointments are announced: Surg.-Comdr. G. P. Adshead and Surg. Lieut.-Comdr. M. J. Aitken to *Diomede*; Surg. Lieut. J. F. H. Gaussen is transferred to permanent list.

Lt.-Col. and Bt. Col. H. B. Fawcus, R.A.M.C., to be Asst. Dir.-Genl., vice Lt.-Col. and Bt. Col. Sir E. S. Worthington, R.A.M.C.

ROYAL ARMY MEDICAL CORPS.

Maj. R. V. Cowey relinquishes the actg. rank of Lt.-Col.

The undermentioned retire on ret. pay: Lt.-Col. and Bt. Col. Sir A. L. A. Webb and Maj. W. MacD. MacDowall.

Maj. G. E. Ferguson and Capts. D. W. John and R. N. Porritt retire, receiving a gratuity.

Capt. E. Davies is placed on the half-pay list on account of ill-health.

MILITIA.

Capt. T. S. Nelson relinquishes his commn. and retains the rank of Capt.

TERRITORIAL FORCE.

Capt. H. E. S. Richards to be Maj. and remains secd.

Capt. A. C. M. Savege, from T.A. Res., to be Capt.

Capts. G. S. Phillips and A. A. Watson (late R.A.M.C.) to be Capts.

The undermentioned, having attained the age limit, are retired and retain their rank: Cols. W. Coates, C. Averill, and H. D. Brook; Maj. W. C. Macaulay; and Capts. W. H. Dickinson, J. H. Jones, J. P. Race, and A. R. Spencer.

The undermentioned relinquish their commns. and retain their rank except where otherwise stated: Capts. K. D. Wilkinson (granted the rank of Maj.), G. B. Pritchard, H. W. Wier, G. C. Williams, and R. A. Kerr.

Sanitary Service: Maj. (Bt. Lt.-Col.) W. Butler relinquishes his commn. and retains his rank.

ROYAL AIR FORCE.

The undermentioned are granted short service commissions: J. C. Osburne as Flight Lt. and V. S. Ewing as Flying Officer.

Flying Officer T. A. G. Hudson is granted a short service commission, retaining his present substantive rank and seniority.

TERRITORIAL DECORATION.

The King has conferred the Territorial Decoration upon Lt.-Cols. A. L. Jones (retd.), H. Collinson, and T. Fraser; Majs. A. A. Martin, S. E. Rigg (retd.), W. B. Milbanke (retd.), and A. B. Whitton (retd.); and Capts. R. C. Clarke and T. J. Faulder (retd.).

DEATHS IN THE SERVICES.

Maj.-Gen. WILLIAM FLACK STEVENSON, C.B., R.A.M.C., honorary surgeon to the King, who died at his residence at Bournemouth on July 7th, aged 78, entered the army in 1866 and after serving as medical officer with the Royal Artillery in the West Indies and India was appointed Professor of Military Surgery at the Royal Army Medical College, London. In the South African War he was consulting surgeon to the Forces, principal medical officer on the lines of communication, and principal medical officer on Lord Roberts's Headquarters Staff (mentioned in despatches and C.B.) He retired in 1905, but during the late war acted as superintendent of local and military hospitals in Bournemouth.

Deputy Surg.-Gen. JAMES HENRY JEFFCOAT, A.M.D., who died at the age of 85, at Surbiton, on July 5th, received his first commission in 1858 and retired on half pay in 1885. He served in the Afghan War of 1878–80 and for his services received the medal with clasp.

Col. JOHN DONALD ALEXANDER, C.B.E., D.S.O., A.M.S. (retired), died on July 9th at Queen Alexandra's Military Hospital, aged 55. He was appointed captain in the R.A.M.C. in 1892, having previously served in the army, became major three years later, and reached the rank of lieutenant-colonel in 1904. After serving in India he returned to England and during the late war was a Deputy Director-General of Medical Services. He was appointed colonel in 1917.

GILBERT BLANE GOLD MEDAL.

The Gilbert Blane gold medal for 1922 has been awarded to Surg.-Comdr. S. W. Grimwade, O.B.E. The three Gilbert Blane medals which during the war remained unadjudged owing to the absence of promotion examinations at that period have been awarded to Surg.-Comdrs. R. St. G. S. Bond, R. W. B. Hall, and S. F. Dudley, O.B.E.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, JULY 10TH.

Smoke Abatement.

In reply to a question by Lord HAMILTON of DALZELL, the Earl of ONSLOW (Parliamentary Secretary to the Ministry of Health) stated that the recommendations of the Committee presided over by Lord Newton on the subject of Smoke Abatement had received careful consideration, and a Bill would be introduced at an early date. There was little expectation of passing the Bill this session, but if their Lordships gave it a second reading it could receive public discussion and general agreement might be secured.

TUESDAY, JULY 11TH.

Milk and Dairies Bill.

The Milk and Dairies (Amendment) Bill was read a third time and passed.

HOUSE OF COMMONS.

TUESDAY, JULY 4TH.

Colonial Medical Services.

ON a vote of £307,637 for the salaries and expenses of the Colonial Office,

Lieut.-Colonel FREMANTLE said it would be unfortunate if the debate on the Colonial Services for the year did not have some reference to the extremely interesting report on the Colonial Medical Service which was mentioned in the Under-Secretary's report on the West Indies. He did not think the public, nor even the House of Commons, sufficiently realised the extraordinary economic value to be attached to that service. It was not the ordinary medical and surgical attention which, individual and important as it was, was mainly humanitarian. It was the general health service that improved health conditions, and therefore the economic efficiency of the whole community. If the Under-Secretary in his tour had gone to British Honduras he would have found the result of the neglect of good advice 17 years ago, when the late Sir Rubert Boyce visited that Colony and reported on the extraordinarily insanitary conditions existing there, on the prevalence of stegomyia mosquitoes, and the imminent danger of yellow fever outbreaks. Nothing, however, was done. Only last year there was an outbreak of yellow fever. Last year, again, the Colonial Office sent out an unofficial inspector to Mauritius to report upon the disgraceful conditions that existed there. After six months' visit the reports published by the Mauritius Government showed that the conditions were imminently dangerous to the public health. A big report had been prepared—he did not know if it had been presented—advocating the establishment of a proper water-supply for Port Louis and the five towns. The inspector suggested some very moderate temporary works which would supply perfectly good drinking-water in the meantime. The expense was limited to the small sum of £1500. But the policy of "wait until there is a considerable epidemic and much loss of life" was adopted. That epidemic took place. Fifty cases of typhoid fever occurred. In his report on the West Indies the Under-Secretary said: "Thanks to strict quarantine regulations yellow fever is now unknown. . . . There remain, however, malaria, dysentery, ankylostomiasis or hookworm, yaws, typhoid, tuberculosis, and venereal disease. The last named are rife. A very considerable percentage of the population is infected with hereditary or contracted syphilis, and very little headway has yet been made against the further spread of venereal diseases." Mr. Wood reported on the recent tour of the National Council for Combating Venereal Diseases, and hoped that it would have considerable results. He (Lieut.-Colonel Fremantle) regretted that in this vote the expenditure for this Council was dropped entirely. In regard to specific tropical diseases, such as malaria and hookworm, the Rockefeller Foundation had done splendid work, especially in regard to hookworm. Again, Dr. Noguchi, of the Rockefeller Foundation, reported in THE LANCET of June 17th on work done in British Honduras. The other day he (Lieut.-Colonel Fremantle) visited the Wellcome Medical Research Institute and there met a student in tropical diseases, who proved to be the senior member of the Mauritius Medical Service, sent there by the Rockefeller Foundation. A service of sanitary inspectors was needed. The Colonial Office had done a good deal in that way already, having appointed and sent out 14 sanitary inspectors to Kenya and 16 to the West Coast. Who was to train them? On the one hand they had the Royal Sanitary Institute, which had done excellent colonial work for the last 25 years. On the other hand they had the Rockefeller Foundation coming forward and making a noble gift. He hoped that they would sufficiently recognise the extraordinarily generous and philanthropic contribution made by the Americans through the Foundation. He hoped that one day the House would pass a vote of thanks to them for their magnificent services in our Colonies. The British Medical Association had done much to focus medical opinion on these subjects. While the medical profession was grateful to the Under-Secretary for the instalments of improvement, they were only instalments. In 1920 they had a report from a Colonial Medical Service Departmental Committee. What had become of that report? They had not yet been given any idea as to what policy was to be adopted towards it. They could not go on with this Colonial Medical Service. They needed an Adviser-General who would be responsible for the training, and be a sort of father in God to medical men when coming home from the Colonies, who could be seen by them at any time, and who could be constantly looking into these problems and advising the department of the Colonial Office. They ought also to have one or two, perhaps three, highly trained and highly experienced travelling medical inspectors to go out to the Colonies and find out things before epidemics happened. Expenditure on these things was an economic expenditure which reacted for the whole of the next generation. Nothing would be so remunerative in the long run as a very considerable money grant paid to the Colonial Office to be used for health and medical services, and in the direction of improving the health conditions of the colony.

Mr. WOOD, in replying to the debate, said that none of the observations which had been made would be lost sight of.

After further debate progress was reported.

WEDNESDAY, JULY 5TH.

Criminal Law Amendment Bill.

Mr. SHORTT, Home Secretary, in moving the second reading of the Criminal Law Amendment Bill, recalled the fact that last year a Bill was introduced dealing with this subject on the lines of the least contentious recommendations of Lord Muir-Mackenzie's Select Committee. That Bill passed its second reading in both Houses by a considerable majority, but unfortunately there was a disagreement on amendments, and as the end of the Session was near the Bill had to be dropped. This year the Government had taken up the Bill as a Cabinet measure. The Government had come to the conclusion that the age of consent to an indecent assault ought to be 16, the same as for carnal knowledge. The main dispute would, he thought, arise on Clause 2, which provided that reasonable cause to believe that the girl in question was over 16 should no longer be a defence. There had been much negotiation about the exemption from this clause of young men who were tempted by girls more to blame than themselves. Those who were strongly in favour of the clause were willing to consent to some exemption, such as that where the person charged was under a certain age—for the sake of argument say 21 or 23; the magistrate might, instead of committing the accused for trial, deal with the case under the Summary Jurisdiction Act and merely bind him over. Many of those who opposed the clause wished that the former ground of defence should remain, so that it might be said that the accused was not guilty of crime at all. The Government had undertaken that something should be done in Committee for the case of the young man, but he was not yet in a position to make a definite statement.

Major LOWTHER moved the rejection of the Bill on the ground that it had not been shown to be necessary. It had been forced on the Government by a certain number of well-meaning women's societies who did not know what they were talking about.

Lieut.-Colonel MOORE-BRABAZON opposed the Bill because in the first place it was the thin end of the wedge of legislation in regard to eugenics, which, while very admirable on paper, were particularly difficult in practice. His second ground of opposition was that it was legislation against one sex more than against another. Everybody would admit that premature sexual intercourse both of males and females was undesirable and should be avoided. The question was rather did the female develop more quickly sexually than the male. All education in this country was really a conspiracy to delay the sexual growth of the boy. In the case of girls any great exertion was quite impossible when they were in the early teens, and consequently they turned much more readily to thoughts of sex than boys.

Sir D. MACLEAN thought that in passing this Bill the House would be legislating not in advance but far behind public opinion.

After further discussion the motion for the rejection of the Bill was negatived and the second reading was agreed to.

Condemned Houses in the United Kingdom.

Mr. TREVELYAN THOMSON asked the Minister of Health the number of houses in the United Kingdom which have been condemned by local authorities or their medical officers of health as unfit for human habitation and still remained occupied, and the population of the areas covered by such

reports.—Sir A. MOND replied: The annual reports for 1920 of medical officers of health for 1500 local authorities showed that out of 1,085,000 houses inspected during the year, 24,210 were reported as unfit. Information as to the number of persons inhabiting these houses is not available.

Death-rate from Zymotic Diseases.

Mr. LUNN asked the Minister of Health if he would submit a return showing the death-rates in the case of each of the zymotic diseases and also of cancer, per million of population, for each decade since the registration of causes of death began, in England and Wales, Scotland, and Ireland, respectively.—Sir A. MOND replied: The information desired by the hon. Member for each decennial period from 1851 to 1910, so far as regards England and Wales, will be found in Table 10 of Part III. of the Supplement to the 75th annual report of the Registrar-General, which was published in 1919. The figures for the last decennium 1911 to 1920 have not yet been published, but the uncorrected death-rates (per million living) during that period are as follows: Small-pox, 0; measles, 275; scarlet fever, 47; whooping-cough, 184; diphtheria, 141; enteric fever, 35; diarrhœal diseases, 603; cancer, 1117. These rates are subject to revision. As regards Scotland and Ireland respectively, the question should be addressed to my right hon. friends the Secretary for Scotland and the Chief Secretary for Ireland.

THURSDAY, JULY 6TH.

Conditions Governing Treatment Allowances.

Mr. MACPHERSON (Minister of Pensions), replying to questions by Mr. DUNCAN GRAHAM with regard to the refusal of treatment allowances to ex-Service men who had been medically certified as unfit for work, said that his hon. friend appeared to be under some misapprehension as regards the conditions governing the grant of treatment allowances. These allowances were not granted because the man might be physically unable to work, but only if in consequence of a course of treatment approved by the Ministry he was rendered unable to provide for his own support and that of his family. Neither fitness nor unfitness for work was itself a criterion, and any such expression of opinion by a medical officer in this connexion was therefore irrelevant, and indeed, contrary to official instructions.

Medical and Dental Services in the Seychelles.

Mr. SWAN asked the Under-Secretary of State for Foreign Affairs whether the articles of food and the drugs necessary for Zaghlul Pasha and his colleagues were available in the Seychelles; whether he was aware that Zaghlul Pasha had had to send to London for the gluten bread necessary for his health; and that Nahas Bey had had to cable to Cairo for instructions for the making of eye-drops.—Mr. CECIL HARMSWORTH replied: The reply to the first part of the question is in the affirmative and to the remainder in the negative.

Mr. SWAN asked the Under-Secretary of State for Foreign Affairs whether he would supply the names and qualifications of the dental and medical practitioners attending Zaghlul Pasha and his colleagues in the Seychelles.—Mr. CECIL HARMSWORTH replied: The chief medical officer in the Seychelles is Mr. Joseph Bartlett Addison, M.B.E., M.R.C.S. England, L.R.C.P. (London). The assistant medical officer is Mr. John Thomas Bradley, M.D. (Brussels), L.R.C.P. and L.R.C.S. (Edinburgh), L.F.P.S. (Glasgow). The dental work on the islands is performed by Mr. Donald Francis Watson, manager of the Government Pharmacy and anæsthetist, who, though not a qualified dentist, has practised on the islands for the last 20 years, and whose services in this capacity are reported by the officer administering the Seychelles as having been of the greatest value to the community.

MONDAY, JULY 10TH.

Cocaine Smuggling from Germany.

Mr. LEONARD LYLE asked the Secretary of State for the Home Department whether, in view of the seriousness of the recent case of cocaine smuggling from Hamburg, any additional precautions against such smuggling were being taken; whether there were adequate women searchers; and whether, since women were largely engaged in this traffic, the rewards for detection could be very largely increased.—Sir J. BAIRD (Under Secretary, Home Office) replied: As regards the steps taken to prevent the smuggling of cocaine and other dangerous drugs, I would refer my hon. friend to the reply given by the Home Secretary to Mr. R. Morris on March 27th. In the case of women suspected of smuggling, the search is conducted by competent women searchers of whom there is an adequate supply and who receive a fee for each case. Rewards are paid for detections made and there appears no reason for increasing such rewards on account of the sex of the offender.

Deterioration Due to Unemployment.

Brig.-General SURTEES asked the Minister of Labour if, taking into consideration the extending evil consequences of the Government grant in regard to growing physical, mental, and moral deterioration to the recipients of both sexes, as well as loss of occupational skill and the will to work, he would introduce legislation authorising the commutation of the uncovenanted benefit into maintenance training grants for short periods to enable suitable potential migrants to practically qualify in a preliminary manner in Britain for taking up agricultural and out-of-door occupations overseas with a view to the permanent maintenance of themselves and their dependants.—Sir M. BARLOW (Parliamentary Secretary to the Ministry of Labour) replied: The deterioration to which my hon. and gallant friend refers arises not so much from the grant of uncovenanted benefit as from the prolonged and unavoidable unemployment. The plan of providing a preliminary training for intending settlers in the Dominions is one which merits careful consideration; but I do not think it would be practicable to divert to this purpose any part of the financial resources of the Unemployment Fund. I may point out, however, that the Empire Settlement Act enables training schemes to be adopted for facilitating the oversea settlement and I understand that the question of preparing such a scheme is being carefully considered.

Low-grade Condensed Milk.

Mr. HURD asked the Minister of Agriculture if he could give the latest figures of the increasing sale of cheap and low-grade condensed milks imported into this country; whether representations have been made to him of the futility of the complicated dilution clause issued by the Ministry of Health to be printed on the label of the tin; and whether he could take steps to make the authorised label read "Skimmed milk, unfit for infants."—Sir A. MOND (Minister of Health) replied: I am informed that the amount of condensed separated or skimmed milk imported during the first five months of this year was about 503,000 cwts., as compared with about 205,000 cwts. of condensed whole milk. Representations have been received on the question of issuing regulations as to labelling. This matter is under my consideration and I shall be happy to consider any suggestions on the point. I have no power to alter the present statutory requirement that condensed separated milk must be labelled as "Machine-skimmed Milk."

Education of Defective Children.

Mr. L'ESTRANGE MALONE asked the President of the Board of Education whether he was aware that in many districts the lack of facilities for defective children was not due to the absence of room in existing special schools but to the absence of special schools in certain areas altogether; and whether, in these cases where there was no school even in adjoining areas, he was prepared to consider the erection of new special schools.—Mr. FISHER replied: I am aware that in certain areas there is an absence of special schools for defective children in spite of the fact that it has been open to local education authorities for many years to provide such schools with the assistance of the Board. Where the circumstances are exceptional I am prepared to consider on their merits proposals for the establishment of new special schools. I am now investigating the whole question of the cost and organisation of these schools, and their proper distribution in the country will certainly be one of the main factors to be considered when it becomes possible to resume their development.

TUESDAY, JULY 11TH.

Pension Appeals and Medical Précis.

Captain BOWYER asked the Minister of Pensions whether he was aware that in the précis prepared for appellants before pension appeal tribunals extracts from original documents were often very inaccurately and carelessly copied, and that often important details were omitted, which not only prejudiced the appellants but confused the court; and would he inquire into the matter.—Major TRYON replied for the Minister deprecating most strongly the suggestion of general failure in the preparation of accurate précis, and expressing his conviction that this work is carried out with care and accuracy. With this opinion the President of the Pensions Appeal Tribunal agreed. It was, moreover, open to the appellant to challenge any statement in the précis, which was sent to him before the hearing; also the original documents were always in court and available to the tribunal for reference.

On the motion for the adjournment Capt. BOWYER again raised this question. He said that on Wednesday of last week he happened to be present when a pension appeal tribunal was functioning. A document upon which a good deal turned was a death certificate, which read: Cause of death, tubercle of the lungs with cavity, formation five years. On turning to the précis he found that there was no mention of the five years. In a second case the cause of death was tubercle disease of the left tonsil nine months, no post-mortem. In the précis there was no mention of the nine months and no mention of no post-mortem. In a third

case cause of death was tubercle disease of the larynx, two months. In the précis there was no mention of the two months. He pointed out the discrepancy to the President of the tribunal, who said he wished he would bring it before the House of Commons, because there were other cases of the kind from time to time.

Major TRYON commented on the method adopted by the hon. Member in bringing this matter forward. He had given no particulars. The Ministry dealt with each case on its merits.

Medical News.

UNIVERSITY OF OXFORD.—At recent examinations the following candidates were successful:—

MASTER OF SURGERY.

L. R. Broster, Trinity; and E. A. Crook, New.

FINAL B.M., B.CH. EXAMINATION.

Materia Medica and Pharmacology.—H. N. Bradbrook, Queen's; R. J. Brocklehurst, University; R. E. D. Cargill, Christ Church; A. F. Clarke, St. John's; C. L. Ellgood, Balliol; K. J. Franklin, Hertford; C. J. Fuller, Queen's; C. A. H. Green, Trinity; L. N. Jackson, Balliol; P. H. Leslie, Christ Church; G. F. L. Mitcheson, Christ Church; H. W. Pearson, Brasenose; A. A. F. Peel, University; V. P. Robinson, St. John's; A. W. L. Row, Brasenose; G. P. Roxburgh, New; H. N. Stokoe, Pembroke; T. S. Townsend, Jesus; H. F. Turney, Magdalen; W. R. Wood, Pembroke; C. R. Young, University; and Alice E. B. Harding, Home Students.

Pathology.—P. W. Boobbyer, Keble; R. J. Brocklehurst, University; R. S. Creed, Trinity; A. D. Dyson, Corpus Christi; C. J. Fuller, Queen's; P. H. Leslie, Christ Church; H. W. Pearson, Brasenose; G. F. Skinner, Exeter; A. Q. Wells, St. John's; G. I. Wilson, Queen's; Dorothy J. Collier, Home Students; Sybil R. Eastwood, Home Students; and Katharine M. Hodgkinson, Somerville.

Forensic Medicine and Public Health.—W. B. Boone, Lincoln; W. R. Brain, New; D. S. Davies, Magdalen; H. A. Gilkes, Christ Church; E. H. Koerner, Magdalen; C. R. Lane, Pembroke; B. W. Williams, Exeter; C. R. Young, University; Nancy B. Ockenden, Lady Margaret; Jean Orr-Ewing, Lady Margaret; and Constance M. Ottley, Home Students.

Medicine, Surgery, and Midwifery.—C. W. C. Bain, Christ Church; W. Champneys, Oriel; S. Hartley, Hertford; R. F. Johnstone, St. John's; D. G. Leys, Balliol; T. L. Ormerod, Queen's; H. A. Osborn, New; H. D. Paviere, Christ Church; B. W. Williams, Exeter; and Dorothy W. Crook, Somerville.

DIPLOMA IN PUBLIC HEALTH.

Part I.—C. Duncomb, K. Falconer, and R. B. Lal.

Part II.—E. H. Creed, R. B. Lal, N. B. Laughton, and E. Newton.

The Welsh Memorial Prize has been awarded to Olive Howland Lister, St. Hugh's College; the Theodore Williams Scholarship in Anatomy to Thomas C. Hunt, Magdalen College; and the Theodore Williams Scholarship in Physiology to Tom S. Townsend, Jesus College.

UNIVERSITY OF MANCHESTER.—At examinations held recently the following candidates were successful:—

FINAL M.B. AND CH.B. EXAMINATION.

P. D. Abbatt, Samuel Adler, Reginald Anderton, J. H. Appleton, K. V. Bailey, J. B. Bennett, Doris H. Bentham, E. W. Clough, *H. M. Coope, †Margaret Derbyshire, Dorothy M. L. Dyson, *Beatrice L. Ellison, H. P. Fay, J. H. Fletcher, E. S. Frischmann, Arthur Ingham, A. A. Pomfret, †Hilda Pratt, Abram Rosenstone, ‡F. H. Scotson (second-class honours), Henry Southworth, J. H. Struthers, C. B. V. Walker, and Margaret Wild.

Obstetrics.—Kathleen M. Eastwood, Percival Fildes, Richard Handley, Doris M. Hardman, Mary Kent, and C. B. Kirkbride.

Surgery.—Kathleen M. Eastwood and James Yates.

Forensic Medicine.—G. B. Lord and Greta Lowe.

* Distinction in Obstetrics. † Distinction in Surgery.
‡ Distinction in Medicine.

THIRD M.B. AND CH.B. EXAMINATION.

Pharmacology and Therapeutics.—R. S. Adam, J. H. Anderson, J. K. Barr, Margaret A. Bromhall, W. C. V. Brothwood, C. V. Brown, Stella H. Brown, T. A. Brown, Elsie Catlow (with distinction), T. E. D. Chadwick, William Chadwick (with distinction), Jenny D. Craig, J. A. Crowther, T. E. Davies, Stanley Devine, Reginald Ellis, J. D. Farquhat, C. R. Fielding, Miriam Florentin, A. G. Forbes, I. H. Freedlander, J. W. Graham, Philip Gregory, Dorothy Huest, James Haslam, G. H. Hayle, A. H. Heyworth, Edward Holmes, W. L. Horton, J. N. Hudson, Elizabeth G. Humble, P. G. Johnson, Phyllis I. Kaufmann, David Kemp, Barbara M. Knight, G. F. Langford, Annie T. Leigh, E. M. Liddle, Hilda M. Linford (with distinction), F. R. Lockhart, A. M. MacGill, C. T. Marshall, William Mottershead, Alice M. Orrell, Henry Penman, Samuel Pope, L. J. Prosser, Olive A. Ransome, A. R. Addey-Redfern, T. W. Rothwell, Eileen Sheehan, Joseph Shlosberg, John Sims (with distinction), H. T. Simmons, G. S. Smith, Lois Stent, R. F. Stubbs, James Troup, H. M. Turner, Jacobus Viljoen, C. L. Walker, Ronald Walshaw, S. E. Ward, Samuel Whalley, Hugh Whittle, Charles Wilcocks, R. M. Williams, Geoffrey Williamson, S. P. Wilson, K. K. Wood, P. B. Wood, Frank Yates, J. M. Yoffey, and N. A. T. Young.

Pathology.—C. N. Aldred, W. B. Bacon, Arthur Barlow (with distinction), C. E. W. Bower, Bernard Bowman, William Broadhurst, J. F. Bromley, Arnold Brown, A. J. E. Cave, Albert Coleman, Bessie E. Cook, Gordon Crompton, Mary S. Davies, Charles Eccleston, N. L. Edwards, R. W. Fairbrother, W. E. Fildes, W. A. J. Fleming, E. J. Foulds, E. St. G. Gilmore, Anne H. Glancy, Allen Glenn, Marjorie A. Grant, M. E. Heywood, Evelyn M. Holmes (with distinction), W. G. Howson, K. H. Jackson, A. M. Jones, Bertha Kahn, L. W. Kay, A. C. Kelly, V. F. Lambert, H. M. Levy, W. B. McKelvie, Leslie Morris, Marjorie M. O'Dea, R. W. Parker, Miles Parkes, Thomas Pierson, Donald Ramage, W. M. Robert, Marjorie Robinson, Kate B. Scott, Agnes Seaston, G. E. Sharp, Margaret Simcock, Dorothy Simmons, H. C. Smith, Wilson Smith, W. G. Southern, Marjorie Thompson, Sarah Walker, Eric Whiteside, Jane M. Wilde, L. J. Witts (with distinction), Marjorie Youatt, and E. J. Warburton.

UNIVERSITY OF LIVERPOOL: FACULTY OF MEDICINE.—The following candidates have been successful in examinations recently held:—

DEGREE OF M.D.

S. S. Shri Kent.

DEGREES OF M.B. AND CH.B. (HONOURS).

Class I.—*†‡H. Cohen, *†M. J. Cohen.

Class II.—‡P. R. Hawe.

FINAL EXAMINATION FOR DEGREES OF M.B. AND CH.B.

Part III.—Ethel Ashton, E. W. Ashworth, Eudora V. Beatty, R. H. Blair, A. Cathcart, Mildred M. Clegg, R. W. Cockshut, C. Cookson, Gladys W. Darlington, J. V. Hall, T. K. Hughes, W. D. Jeans, A. R. Jones, Irene E. Kenworthy, Eleanor Lancelot, N. H. H. Longton, B. L. McFarland, F. Q. McKeown, Annie Mather, Muriel Pickering-Jones, J. K. Reid, D. Riding, C. F. H. Sergeant, Mary D. H. Sheridan, J. E. T. Shirlaw, Enid F. Stowell, J. E. Sykes, A. K. P. Tobin, C. H. Walsh, Dorothy A. Williams, and Grace H. Wood.

Part I.—V. C. Cornwall, L. Davies, R. Y. Dawbarn, Kathleen Edgecombe, C. K. D. Edwards, D. P. Finn, E. J. Foley, N. D. Fraser, S. C. Goldstone, W. F. Jones, T. S. King, D. Kippax, G. T. Krajewski, W. J. Laird, Lilian W. Massey, and §J. I. Noble.

Part II.—‖B. Abelman, A. R. D. Adams, J. Berkson, R. W. Brookfield, T. L. Bulmer, M. Byala, I. Casdan, ‖M. Cohen, R. G. Cooke, **R. Cotter, I. H. Davies, Hilda M. Davis, F. Earlam, C. K. D. Edwards, D. P. Finn, D. Flenley, F. S. Fowweather, Susan Gluck, A. B. Griffiths, J. R. Griffiths, J. Hallam, C. W. Healey, S. Hesselberg, Enid M. Hughes, ‖Elizabeth Hunt, L. E. Johnson, F. H. Jones, T. J. Kirkpatrick, D. A. Levin, Eileen M. Lloyd, Marion R. Lunt, **D. Macfarlane, Mary M. McMillan, J. McWilliams, **P. Malpas, G. H. Mann, J. I. Noble, T. V. O'Brien, ‖B. Ordman, **C. H. Owen, ‖D. U. Owen, Eleanor M. P. Pearson, W. E. Pennington, J. D. O'M. Poole, E. L. Roberts, J. Roberts, R. A. Roberts, Kathleen M. Robertson-Dunn, J. R. A. Tallack, Dorothy A. Taylor, Elizabeth M. Theron, H. A. Thomas, J. G. Thomas, R. W. Thomas, A. Tumarkin, H. Walker, A. E. Wall, E. J. Whymark, H. P. Widdup, **A. G. Wilkinson, E. B. Wilkinson, J. Williams, and Mary G. T. Williams.

DIPLOMA IN PUBLIC HEALTH.

Evelyn F. Bebbington, Louise Denil, J. Flanagan, W. M. Frazer, S. C. Gracias, G. R. James, Annie A. Muir, Edith M. Seward, S. S. Shri Kent, Marion Thomson, J. C. Twomey, and C. J. Young.

* Distinction in Medicine.
† Distinction in Surgery.
‡ Distinction in Obstetrics.
§ Distinction in Pathology
‖ Distinction in Public Health.
** Distinction in Forensic Medicine and Toxicology.

ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At the Second Professional Examination in Anatomy and Physiology, held on June 29th and 30th and July 3rd, 4th, 5th, and 6th, 187 candidates presented themselves of whom 93 were approved and 94 were rejected. The following are the names and medical schools of the successful candidates:—

M. Abse, Cardiff; R. Armsden, Univ. Coll.; E. W. Arndt, Ceylon and Middlesex; C. J. Bashall and W. R. Blunt, St. Thomas's; Eleanor G. Burdett, Royal Free; A. F. Chalkley, Leeds; M. Chaudra, King's Coll.; J. R. B. Chatterton, Univ. Coll.; D. H. Couch, Guy's; P. V. Crameri, Univ. Coll.; P. C. Cumber, Guy's; E. W. P. Davies, St. Bart.'s; J. S. Dees, Middlesex; G. S. W. de Saram, St. Bart.'s; V. P. de Zoysa, Ceylon; A. C. Dick, St. Bart.'s; D. C. Drake and J. Dywien, Guy's; O. M. Ellis, Cardiff; R. H. El Sawy, Guy's; C. W. Evans, St. Mary's; J. Evans, Cardiff; H. E. Filmer and V. L. Fisher, Guy's; W. S. Fricker, Cardiff; C. L. Froelich, Guy's; S. W. Gabbe, Cape Town; W. F. Gaisford, St. Bart.'s; H. L. Groom, Univ. Coll.; G. Hamada, Birmingham; M. J. Harker, Cambridge and St. Bart.'s; B. E. Hawkins and A. E. Hill, Guy's; G. L. C. Jones, Cardiff; L. R. Jones, Guy's; T. M. Joseph, Madras and London; C. T. Kitching and W. R. Kusel, St. Thomas's; Leonora M. K. Lines, Univ. Coll.; F. G. Macdonald, St. Thomas's; J. R. Macdougall, St. Bart.'s; W. S. Macgowan, Middlesex; D. R. Martin

Guy's; J. H. Matthews, Manchester; S. Mellins and C. A. L. Meredith, Middlesex; H. M. Mikhail, King's Coll.; E. R. W. Mons-Glaser, Basle and Middlesex; J. E. C. Morton, St. Bart.'s; C. E. Nicholas, London; R. A. Norman, Guy's; C. H. Parker, London; R. Paton, Cardiff; R. P. Perera, Ceylon; R. K. Phillips, St. Thomas's; T. J. Pittard and R. J. Rankin, Cardiff; J. R. Ratcliffe and S. M. Reeders, Guy's; T. Rees, St. Bart.'s; M. V. Roberts and W. E. Rodgers, London; A. E. Ross, St. Bart's; A. T. F. Rowley, Univ. Coll.; T. St. J. H. Silvester, Guy's; F. C. Simpson, Manchester; B. Singh, King's Coll.; E. G. Smallbone, Guy's; C. F. J. Smith and L. P. Spero, St. Mary's; J. S. Spickett, Cardiff; R. Stuart, St. Bart.'s; E. C. N. Strong, Birmingham; E. R. Sweeney, St. Mary's; W. K. Targett and A. C. Taylor, Guy's; D. E. Thomas, Cardiff; E. D. Thomas, Middlesex; H. Trafford and H. van der Post, Guy's; W. A. Vickers, Liverpool; H. O. Watkins-Pitchford, St. Thomas's; F. L. White, London; F. Widlake, Guy's; C. H. Wight, St. Bart.'s; G. Wigneraja, Ceylon and Middlesex; J. D. V. Wijoyaratno, King's Coll.; J. M. Wilder, London; T. I. Williams, Guy's; D. A. Wilson, Middlesex; and F. A. Wilson and O. H. M. Woodbridge, Guy's.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—The annual meeting of Fellows of the College to elect three members of the Council was held on July 6th, Sir Anthony Bowlby, the President, in the chair. There were six candidates for three vacancies. The Fellows elected were Sir William Thorburn, Sir Charles A. Ballance, and Mr. R. P. Rowlands.

UNIVERSITY OF LONDON.—The Council of King's College have instituted a special scholarship under the Worsley Foundation for the post-graduate training of a fully qualified medical man, with a view to his proceeding or returning to India as a medical missionary. The scholarship is of the value of £150 together with free medical education at some post-graduate institute. The ordinary Worsley Scholarship, value £100, payable in five annual instalments of £20 each, together with free medical education at King's College and King's College Hospital, is also offered. The scholarship was founded for the education of medical missionaries proceeding to India, and a scholar must on election obtain security for the purpose of ensuring that he will proceed as a missionary when his education is completed. Applications, accompanied by testimonials, either for the post-graduate or ordinary scholarship, should be sent to the Dean of King's College not later than August 31st, 1922.

NATIONAL CONFERENCE OF LOCAL HOSPITAL COMMITTEES.—The Voluntary Hospitals Commission, of which Lord Onslow is chairman, has organised a National Conference of representatives of local hospital committees to be held in the conference room of the Ministry of Health on July 18th and 19th to discuss, among other things, the question of hospital revenues. The Minister of Health is expected to be present.

TENTH INTERNATIONAL CONGRESS OF OTOLOGY.—This congress, the first of its kind which has been held since 1912, will take place in Paris from July 18th to the 21st. One sitting will be devoted entirely to a laryngeal subject, the choice having fallen on the Treatment of Cancer of the Larynx. The social attractions of the gathering will include two receptions, one at the Hotel de Ville, a banquet and a day's trip to Verdun on July 22nd. A large number of British and over-seas specialists have already inscribed themselves. Further particulars can be obtained from the secretary of the English committee, Mr. Lionel Colledge, 22, Queen Anne-street, London, W. 1, or applications may be sent direct to the secretary general, Dr. A. Hautant, 28, rue Marbeuf, Paris (VIII^{e}).

THIRD INTERNATIONAL CONGRESS OF THE HISTORY OF MEDICINE.—The following time-table has been drawn up for the Congress which is to be held from July 17th to 22nd.

Monday (17th), 10.30 A.M.: Opening of the Congress at the Royal Society of Medicine by the Minister of Health. Reception of delegates. Address by the President, Dr. Charles Singer. Address on behalf of the foreign delegates by Prof. Laignel-Lavastine (Paris). 2.15 P.M.: Reception and address by Sir Humphry Rolleston, President of the Royal College of Physicians, at the College, Pall Mall, where books, manuscripts, and other objects of historical interest will be shown.

3.30–6: Tea offered by Sir D'Arcy Power and Lady Power, 10a, Chandos-street, Cavendish-square. 9: Reception by the President and Mrs. Singer at the Royal Society of Medicine. Address by Prof. Elliot Smith.

Tuesday (18th), 10 A.M.–12.30 P.M.: Papers on the history of epidemic diseases by Dr. Tricot-Royer (Antwerp), Dr. Cawadias (Athens), Prof. W. R. Simpson, Mrs. Singer, Dr. E. Wickersheimer (Strasbourg), Dr. Neveu (Paris), Sir William Collins, Miss Buer, and Dr. Michael Foster. 2.30–4.30: Papers on the history of anatomy by Prof. Laignel-Lavastine, Dr. de Lint (Gorinchem), Prof. W. Wright, and Dr. E. T. Withington.

4.30: Reception by Lord Mayor and Lady Mayoress at Mansion House. 7–11.30: Reception by Sir James Stewart and Lady Purves Stewart.

Wednesday (19th), 10 A.M.–12.30 P.M.: Papers on the history of anatomy by Prof. Menetrier, Dr. Villaret, and Mr. Fosseyeux (Paris), Dr. Krumbhaar (Philadelphia), Dr. Singer, Dr. F. K. Lander, Dr. T. Wilson Parry, and Dr. J. D. Comrie. Afternoon: Visits to the Barbers' Hall, College of Surgeons, and Apothecaries Hall.

8.30–11: Conversazione at the Wellcome Historical Medical Museum.

Thursday (20th), 10 A.M.–12.30 P.M.: Papers on anatomy by Dr. Tricot-Royer (Antwerp), Dr. Torkomian (Constantinople), Prof. Jeanselme (Paris), and Dr. van Gils (The Hague), by Dr. N. G. Horner, Prof. Lindsay, and Dr. de Lint. 2.30–4.30: Papers on pharmacy by Dr. Dorveaux (Paris), Mr. J. B. Gilmour, and Mr. C. J. S. Thompson.

Friday (21st), 10 A.M.–12.30 P.M.: Papers on various subjects by Dr. van Gils, Dr. Sigerist (Zurich), Dr. Wickersheimer, Dr. A. F. de Alcalde (Madrid), and Dr. Le Clerc and Dr. Le Lorier (Paris). 2.30: Papers on veterinary medicine by Mr. Sevilla (Paris), Major-Gen. Sir F. Smith, Mr. L. Moule, Mr. F. E. Bullock, and Mr. F. J. Cole; and on various subjects by Dr. P. Delaunay (Le Mans), Prof. Castiglioni (Trieste), Dr. Sunderland, Mme. Panayotatou (Alexandria), and Dr. Muthu. 5: Visit to St. Bartholomew's Hospital and historical address by Sir D'Arcy Power.

7.30: Banquet at the Hotel Cecil.

On Saturday an excursion will be taken to Windsor Castle and up the Thames.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

Tuesday, July 18th.

GENERAL MEETING OF FELLOWS: at 5 P.M.
Ballot for election to the Fellowship.

Thursday, July 20th.

DERMATOLOGY: at 5 P.M. (Cases at 4.30 P.M.).
Cases: The following will be shown by:—
Dr. Christopherson (introduced by Dr. C. Semon): Leishmaniasis of the Skin.
Dr. H. C. Semon: Case for Diagnosis.
Dr. H. W. Barber: Case of Psoriasis in an Infant aged 2 Months.
And other cases.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE POST-GRADUATE LECTURES, 1, Wimpole-street, W. 1.
WEDNESDAY, July 19th.—5 P.M., Mr. Victor Bonney: Myomectomy as opposed to Hysterectomy.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, Balham.
WEDNESDAY, July 19th.—4 P.M., Dr. S. Wyard: The Investigation of Obscure Cases of Sudden Death.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C. 1.
THURSDAY, July 20th.—4 P.M., Dr. Thompson: Dwarfs.

MANCHESTER FRENCH HOSPITAL, 24, Acomb-street, Whitworth Park, Manchester.
THURSDAY, July 20th.—4.30 P.M., Dr. Solomon Herbert: Hypnotism.

Appointments.

BEVERS, E. C., M.B., B.Ch. Oxon., F.R.C.S., has been appointed one of the Medical Referees under the Workmen's Compensation Act for County Court Circuit No. 36.

DANNETT, R. M., M.B., B.S. Lond., Assistant Medical Superintendent to Camberwell Infirmary.

DEVONALD, A., L.R.C.P. Lond., M.R.C.S., Surgeon to the County Police, Bridgnorth and District.

GODFREY, H. M., M.D., C.M., Senior House Surgeon, Warrington Infirmary and Dispensary.

MCCULLAGH, W. McK. H., F.R.C.S. Eng., Assistant Resident Medical Officer, Queen Charlotte's Lying-in Hospital.

Surgeons under the Factory and Workshop Acts: GAINER, E. ST. C., L.R.C.P. Lond., M.R.C.S. (Thrapston); KING, L. R., L.R.C.P. Lond., M.R.C.S. (Stow-on-the-Wold).

Vacancies.

For further information refer to the advertisement columns.

Aberdeen University.—Lecturer in Bacteriology. £600.

Aylesbury, Royal Buckinghamshire Hospital.—Res. M.O. £200.

Barnsley and Wakefield Joint Sanatorium.—Asst. Tuberc. O., &c. £400.

Barnstaple, North Devon Infirmary.—H.S. £170.

Barrow-in-Furness County Borough.—Asst. M.O.H. and Asst. Tuberc. O. £600.

Bath, Royal United Hospital.—H.P. and Jun. H.S. £180 and £150 respectively.

Birmingham General Dispensary.—Res. M.O. £450.
Birmingham, Rubery Hill and Hollymoor Mental Hospital.—Two Jun. Asst. M.O.'s £350 each.
Birmingham University.—Professor of Pathology. £1000.
Bootle Borough Hospital.—Two Jun. H.S.'s. £150 each.
Bradford, Royal Eye and Ear Hospital.—Hon. Aural S.
Bury Infirmary.—Jun. H.S. £150.
Cambridge, Addenbrooke's Hospital.—H.S. £130.
Cancer Hospital, Fulham-road.—H.S. £150.
City of London Hospital for Diseases of the Chest.—Physician.
Denbigh, North Wales Sanatorium.—Asst. Res. M.O. £250.
Derby County Borough.—Maternity and Child Welfare O. £500.
Doncaster Royal Infirmary and Dispensary.—Sen. H.S. and Jun. H.S. £220 and £175 respectively.
Dundee District Asylum.—Asst. M.O. £293.
Exeter, Royal Devon and Exeter Hospital.—Asst. H.S. £150.
Exminster, Devon Mental Hospital.—Third Asst. M.O. £300.
Frere Hospital, East London, South Africa.—Res. M.O. £350.
Gillingham, Kent.—M.O.H. £750.
Glasgow, Victoria Infirmary.—Visiting Surgeon.
Gloucestershire Royal Infirmary.—Asst. H.S. £150.
Grantham, Ministry of Pensions Hospital.—Jun. M.O. £350.
Hackney Union.—Two District M.O.'s. £80 each.
Hospital for Consumption and Diseases of Chest, Brompton, S.W. H.P. £50.
Hull Royal Infirmary.—Asst. H.S. £150.
Leeds General Infirmary.—Res. Ophth. O. £120. Ophth. and Aural H.S. £50.
Liverpool, Ministry of Pensions Hospital, Maghull and Knotty Ash.—Jun. M.O.'s £350 each.
Liverpool University.—Lecturer in Pathology. £500.
Manchester, Ancoats Hospital.—H. S. £150. Hon. Radiologist.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Manchester Royal Infirmary.—H.P.'s and H.S.'s. £100 each. H.S. to Aural, &c., Depts. £100.
Manchester, St. Mary's Hospitals for Women and Children.—Asst. M.O. £100.
Miller General Hospital for South-East London, Greenwich-road, S.E.—H.P. and H.S. Each £150.
National Hospital for Diseases of the Heart, Westmoreland-street, W.—Res. M.O. £150.
Nottingham City Institution, &c., Bagthorpe.—Res. Asst. M.O. £300.
Nottingham General Hospital.—Res. Cas. O. £250.
Portsmouth, Royal Hospita.—H.S. £150.
Prestwich, Manchester, County Asylum.—Locum Tenens. £8 8s. per week.
Reading, Royal Berkshire Hospital.—H.P. £200.
Royal London Ophthalmic Hospital, City-road.—Third H.S. £100.
St. George's Hospital, S.W.—Res. M.O. £300.
Salford Royal Hospital.—Asst. M.O. (part-time). £75.
Sheffield Royal Infirmary.—Ophth. H.S. £150.
Southampton, Royal South Hants and Southampton Hospital.—Jun. H.S. £150.
Stoke-on-Trent, North Staffordshire Infirmary, Hartshill.—H.S. £200.
Swansea General and Eye Hospital.—H.P. £200.
West Bromwich and District Hospital.—Res. Asst. H.S. £180.
West Ham Union.—Res. Asst. M.O. £469 14s.
West London Hospital, Hammersmith-road, W.—Hon. Med. Radiographer.
Westminster Hospital, Broad Sanctuary, S.W.—Asst. H.P. and Asst. H.S. £52.
West Riding County Asylum, Wadsley.—Fourth Asst. M.O. £400.
Wigan Education Committee.—Asst. Sch. M.O. £500.
Wigan, Royal Albert Edward Infirmary.—Jun. H.S. £175.

Births, Marriages, and Deaths.

BIRTHS.

DYKE.—On July 5th, at 29, Lower Seymour-street, W. 1, the wife of S. C. Dyke, M.B., B.Ch., of a daughter.
LONGRIDGE.—On July 3rd, at Lansdown-place, Cheltenham, the wife of C. J. Nepean Longridge, M.D., F.R.C.S., of a son.

MARRIAGES.

BALLINGALL—CHANDLER.—On May 3rd, at St. George's Cathedral, Jerusalem, Captain David Charles Gordon Ballingall, M.C., R.A.M.C., to Rosa Beatrice Chandler, eldest daughter of Mr. and Mrs. A. B. Chandler, formerly of Seagry, Chippenham, Wilts.
TONKIN—HANDLEY.—On June 14th, 1922, at Pietermaritzburg, Natal, Bertie Moorwood Tonkin, M.R.C.S., L.R.C.P., L.D.S. Eng., son of Mr. and Mrs. H. Vincent Tonkin, Greytown, Natal, to Iris Viola Rosemary Handley, youngest daughter of the late Mr. and Mrs. T. L. Handley, "The Folly," Greytown, Natal.
WEBSTER—FINDLAY.—On July 6th, at Kinnettles Parish Church, Dr. A. U. Webster, M.C., to Grace, fourth daughter of the late Charles Findlay, Slatefield and Mains of Kinnettles, Forfar.

DEATHS.

ALEXANDER.—On July 9th, at Queen Alexandra's Military Hospital, Millbank, Colonel John Donald Alexander, C.B.E., D.S.O., A.M.S. (retired).
JEFFCOAT.—On July 5th, at Avenue Elmers, Surbiton, James Henry Jeffcoat, Deputy Surgeon-General, A.M.D., aged 85.
MOSS.—On July 3rd, at Millbank Military Hospital, Captain J. G. Owen Moss, M.D., I.M.S., aged 32.
STEVENSON.—On July 7th, at Bournemouth, Major-General W. F. Stevenson, C.B., K.H.S., A.M.S. (retd.) aged 78.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

UNIFICATION OF LOCAL HEALTH ADMINISTRATION.*

BY E. W. HOPE, O.B.E., M.D., D.SC. EDIN.

IN the gradual evolution of sanitation, areas whose sanitary authorities have had little or no opportunity to compare notes with one another, have advanced on lines divergent no doubt, but still meeting the necessities of those areas. In some, however, the units of administration have tended to become detached and isolated from one another, with the result that progress has been achieved only after avoidable discomfort and friction and attendant delays; in others the trend from the beginning has been towards closer unification, and those who have had experience of the two systems fully recognise which is the better, so far as public health is concerned.

It is perfectly true that the sanitary administration of practically every area in the country has been attended with markedly good results, but my own personal experiences, not only in connexion with Liverpool but in many other districts as well, have convinced me that the closer the unification the more precise is the direction of the sanitary measures.

So far as local administrative areas are concerned, we usually find that the legal departments of those areas furnish a broad general indication of the principles to be followed. The many ramifications requiring legal guidance are coördinated under and receive their direction from one central head; in no city, nor county, do we find two or three town clerks, nor divisions of the legal work into water-tight compartments. The many health ramifications require to be no less closely associated; for example, it is inadvisable that the control of the health of school-children should be wholly or partially divorced from the control of the health of children below school age, or of those above that age. Equally, it is undesirable that an important health measure such as the prevention of overcrowding, the control of lodging houses, or of sublet houses, should be regarded as a police and not a sanitary measure; or that the supervision and control of food-supplies should lie outside the purview of the local medical officer of health.

It may, no doubt, be quite justly said that in many large areas it is impossible for the one officer personally to supervise the many aspects of sanitation which affect that area; but obviously as the coördinating centre he would be provided with adequate skilled assistance, exactly as is done in other departments of local administration, legal, engineering, educational, &c. It does appear that there are numerous areas which are lacking in coöperation in these particulars, the point being not that the work is badly done, but that it would be much better and less expensively done, and done with the added comfort of mutual assistance, by welding together the whole of the health administration in one control.

Local Initiative.

Modern methods of sanitary administration are the result of the initiative taken by the area itself. The improving impulse has almost invariably come from the district itself and from no other source. The system of sanitary administration in this country rests upon that fundamental fact. Enactments obtained from Parliament by progressive local authorities have been the means of giving trial and rehearsal of measures which in due course have led the Government, on being satisfied as to their usefulness, to extend these local provisions to the whole country. This procedure was virtually the basis of the Public Health Acts, and many other Sanitary Acts besides; for example, a whole series of Notification Acts—Notification of Births, Notification of Tuberculosis, Notification of Infectious Diseases; of Acts to promote the welfare of motherhood and infancy, to prevent the sale of tuberculous milk, and many other public Acts—rest upon legislation obtained in the first instance by various local bodies, to some of which measures, I am bound to say, the central authorities at first showed none too much sympathy. Many persons are unfamiliar with this fact, and cherish the idea that public health legislation owes, and continues to owe, its origin to the watchfulness and the omniscience of a body whose seat is in London.

* Abstracted from a memorandum submitted to the Plymouth Congress of the Royal Institute of Public Health.

The Unification of the Central Supervisory Health Administration.

It will be obvious that one very effective way, indeed the only effective way, of promoting unification in local sanitary administration will be the lead, which it is in the power of the Government to give, which will result from unifying the central supervisory health administration. No one having the least acquaintance with the enormous commercial interests controlled by the Board of Trade, or with the equally important educational duties exercised by the Board of Education, or with the wide purviews and responsibilities of the Ministry of Agriculture, or of the Home Office, can fail to appreciate that the primary functions and great solicitude of these bodies must necessarily be the discharge of the heavy duties imposed upon them, the scope of which is indicated by their names. That each of them realises the importance of the incidental questions of health which arise in the case of each is manifested by the fact that, in the absence of any central body to which they could look for guidance and help in health matters, each one has found it necessary to establish its own particular health subsection; each, no doubt, is a strong and vigorous subsection which meets well the particular needs of each department, and is, moreover, growing stronger as the importance of health matters develops and is more fully recognised. Nevertheless, it is a mere accessory and side-show to the great functions with which the departments are primarily concerned, and for which they were established.

The effect of this upon local administration hardly calls for comment. So long as it is found necessary at the centre to divorce various health interests from one another there must, obviously, be a reflex at the periphery; so long as divisions exist at the centre, divisions will exist at the periphery. We all hope that in the fullness of time all health questions at present squandered over many departments will be centred in one body, whose dominating note and interest will be the prevention of disease, and the preservation of health, from whatever source the menace to it may come, industrial, social, educational, or other.

The Relationship of the Ministry of Health with Sanitary Authorities.

The relationship of the Ministry of Health with sanitary authorities is, no doubt, in many ways closer than it formerly was, and to that extent an improvement in administration has resulted. The system of grants has been a great stimulus, more especially to the less energetic type of sanitary authorities, who have themselves been stimulated by these grants to spend money in necessary directions, and have been rewarded by the satisfactory results achieved.

It is, however, an extremely difficult if not an impossible task for any Ministry to appreciate in every detail the varying needs and circumstances associated with local conditions, and the attempt actually to administer local details from London is a hopeless proposition, however largely the inspectorial staff may be increased with this object in view. It can, in fact, only result in a local discouragement and paralysis exactly proportionate to the amount of unnecessary interference, followed by anything but a promotion of public interests. The knowledge and experience of their own local conditions and necessities, acquired in the course of years by a progressive sanitary authority, deserve consideration, and if this is conceded interference will not arise.

LOOSE-LEAF BOOKS FOR THE DOCTOR.

WE have received from Kalamazoo, Ltd. (head offices Northfield, Birmingham), a specimen of the Noretta binder, which is their latest development of the loose-leaf principle and combines the security of a bound book with the freedom of a card system. The mechanism is simple and ingenious. By raising two clips the back cover runs freely along the thongs on which the sheets are threaded when the latter can be removed and inserted at will. The cover is stiff or limp at option, and sheets are stocked in 30 or more standard sizes, varying from 4¼ × 5½ to 19¼ × 22½ in. Sheets are supplied plain, faint line, or ruled to order. The binders would serve admirably for any kind of lecture or note-taking. The limp-covered binder can readily be carried in the pocket for clinical notes on a visiting round. Sheets when full can be transferred to an indexed cover. The price varies, according to size and quality, from 3*s.* to 20*s.*

Messrs. H. K. Lewis and Co., Ltd. (136, Gower-street, London, W.C. 1), have called our attention to the Practitioner's Loose-Leaf Pocket Book, which has been designed for use in conjunction with a card index cabinet. The book contains detachable cards, 6 × 3¾ in., for weekly visiting list, case record, temperature chart, obstetric case record, vaccinations, and infectious diseases. The cover has a six-ring mechanism, easily opened and closed, and, with an outside measurement of 6½ × 4¼ in., can readily be carried in the pocket. The book is durable and well-finished, the price being 7*s.* 6*d.* in imitation morocco or 10*s.* 6*d.* in black morocco with pocket.

THE TREND OF MEDICAL STUDY.

PRECEPT and experience have always been rival claimants for the early periods of medical study. In 1838 it was said in our own columns that educational legislators seemed to imagine that the student was all ear—all memory—nothing, in fact, but Locke's blank sheet of paper for lecturers to blot and blur and write upon. At that time the medical youth already depended largely upon "manuals," "dissecting guides," and the like, instead of honestly earning knowledge for themselves; and in the same year Mr. Henry Hancock, speaking at Charing Cross Hospital, attributed a great share in producing this evil to the then system of examination adopted at the College of Surgeons. "I actually knew," he said, "three young men who passed their examination without ever having had a scalpel in their hands . . . . one of them was highly complimented by the President of the College for the great proficiency he had displayed." That the binnacle has now gone full circle is evident from the resolutions and recommendations issued by the General Medical Council in regard to professional matters, which were adopted during the recent summer session of the Council; and the College of Surgeons was the first examining body to revise its regulations on the basis of the Council's recommendations.

VITAL STATISTICS FOR 1921 OF NON-NATIVE OFFICIALS IN WEST AFRICA.

THE returns for 1921 of these statistics are published by the Crown Agents for the Colonies. We learn from the remarks appended to the statistical tables that the reversion to normal conditions in West Africa has been generally complete during the year under review, and that it is now possible fairly to make comparisons with the records of pre-war years. The death- and invaliding-rates show considerable improvement on those of 1920, the former being almost the same as, and the latter less than, the similar rates in 1913. The death-rate is 12·0 per 1000 against 16·3 per 1000 in 1920—a result largely due to the excellent figures for Nigeria, for which colony the death-rate is only 8·4 per 1000, as against 20·0 per 1000 for the Gold Coast. Of the 37 deaths recorded, 28 occurred in West Africa and 9 in the United Kingdom. The most frequent cause of death was blackwater fever (seven cases, and as a complication in two other cases). Malaria and various heart affections appear next in frequency. Two deaths only were caused by accident. The invaliding-rate has fallen to 16·6 per 1000—the lowest figure on record, being only 25 per cent of the rate recorded 17 years ago. Twenty-five officers were pensioned during the year on completing full qualifying service, against 21 in 1920. The number of officials over 52½ years of age at the beginning of the year was 86. Officers included in the "pensioned" list have been for not less than seven years in the West African service, except in a very few cases of transfer from pensionable appointments elsewhere.

Sale of Relics.—On July 26th Messrs. Sotheby will offer for sale a series of original autograph letters and other relics of Edward Jenner.

N. S. P.—The proof with corrections arrived only after we had gone to press, because it was insufficiently stamped. According to the Postal Regulations which came into force on May 29th, 1922, printed packets prepaid one halfpenny only and intended for despatch on the day of posting must be posted not later than 3.30 P.M. in London or, in the provinces, not later than such time as may be announced in the Post Office window notices. The minimum rate of postage for all packets sent at the printed paper rate and intended for despatch by the night mail, is one penny, if posted after the specified time.

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